The “Policy-Implementation” Gap in Natural Heritage System Planning: An Analysis of Mount Pleasant, Brampton, Ontario.

by

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Abstract

Does the existing natural landscape shape new communities? This study analyzed whether the natural heritage goals for new development as articulated in municipal planning policy were implemented successfully. Mount Pleasant, Brampton, Ontario, a recently-built community was used as a case study. This research reviewed how the planning process unfolded by analyzing the planning policies and studies produced through the development process. The lenses through which this analysis was performed are environmental planning approaches including landscape ecology, ecodesign, green infrastructure, and the ecosystem approach. There is a policy-implementation gap between landscape policy and planning practice, meaning that there is a failure to translate policies and plans into sustained on-ground outcomes for conservation. The analysis found that the new community did not reflect natural heritage policies. The Natural Heritage System planning process was not based on the existing natural features, rather, it was driven by maximizing developable area from the very beginning of the planning process. This paper concludes with suggestions about how planners can work towards closing this policy-implementation gap in order to create better conservation outcomes.

Foreword

My area of concentration focuses on planning for a balance between environmental conservation and urban development in Ontario. This focus stems from my interest in co-ordinated land use planning to balance growth and urban development needs with the protection of the natural environment (MMAH, 2015). As discussed in my Plan of Study, I use the term "balance" to refer to the incorporation of conservation into human aggregated spaces in light of continued sprawl and urbanization. This Major Research Paper is one component of my Plan of Study that allowed me to critically engage with the issues and explore the key theories and practices associated with my Area of Concentration. Through my research of the planning process behind the Mount Pleasant Natural Heritage System, I was able to study environmental and land use planning, as well as other planning components such as environmental assessment and resource management, in an attempt to balance environmental conservation with urban development. My research, specifically my policy analysis, allowed me to study the policies affecting land-use planning, understand how they are applied in urban development and environmental conservation in Ontario, and understand the challenges behind their implementation. Through my research, I was also able to study planning for a balance between environmental conservation and urban development through a landscape ecology lens, by questioning the ideology of nature, and by gaining an understanding of the complexities of this goal within a capitalist system.

This Major Research Paper incorporates all three of my Learning Components and fulfills my Learning Objectives for each Component. The first Learning Component in my Plan of Study is *Environmental Planning*. Through my research, I gained knowledge of environmental planning theory and methods by studying how environmental planning approaches (landscape ecology, ecodesign, green infrastructure and the ecosystem approach) are incorporated into natural heritage policy in an attempt to balance development and conservation. My policy analysis enabled me to uncover the factors that contribute to the failure to implement environmental planning theories on the ground. My research also allowed me to gain practical knowledge of how the environmental planning process unfolds and how this process is influenced by the same profit-driven economic factors that drive urban sprawl and lead to shortcomings for conservation.

My second Learning Component is *Environmental Assessment/Resource Management*. My research furthered my understanding of the importance of comprehensive environmental assessment as a precursor to planning new developments in order to identify and conserve existing natural features.

My research sheds light on the shortcomings that exist in environmental inventorying and environmental impact assessment, in which preconceived land use plans that maximize developable area determine the Natural Heritage System and natural features to be conserved, despite environmental assessment. My research also gave me an understanding of resource management at the neighbourhood scale, and the relationship between environmental resources (specifically, land and stormwater), ecological, economic, and social considerations and how conflicts often resulted in ecological tradeoffs. My research allowed me to gain more knowledge about additional land-use planning tools that attempt to balance urban development with environmental conservation such as natural heritage system planning, watershed planning, and ecological restoration.

My final Learning Component is *Land Use Planning*. My research increased my working knowledge of land use planning law including regulatory and policy controls affecting land use planning in Ontario. This includes provincial land-use plans including the Provincial Policy Statement (PPS) and Growth Plan, and municipal Official Plans and Secondary Plans. My research gave me practical knowledge of the development application and review process, the stakeholders involved in this process, and how decisions are made that shape development implementation.

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Chapter 1: Introduction

Walking along the natural heritage system trail in the new community of Mount Pleasant in Brampton, Ontario, feels like walking through an isle of green in a sea of suburbs (see Appendix 2 Maps 1, 2, 3; Appendix 3 Figures 1, 2). The calls of Red-Winged Blackbirds emanating from the reeds aligning Huttonville Creek is prominent, while mallard ducks and families of geese glide across ponds, and robins hop amongst the young trees. It feels like an oasis from Brampton's sprawling development, a place of "nature in the city".

Yet, the signs that this area is not so natural, or ecologically sound, are all around. The natural area is squeezed between rows of detached houses, with backyard fences providing the abrupt edge between nature and suburban development. The creek follows an unnaturally straight, engineered course perfectly aligned between the subdivisions on either side (Map 3; Figures 3–10). The walk along the trail soon feels repetitive as the same engineered configuration of ponds, pedestrian bridges, and roads are encountered.

The large ponds where waterfowl converge are foul smelling and completely engineered with retaining walls, and inlets where stormwater runoff from the subdivisions pour in, and outlets that release this water into the creek (Figures 11–19). In fact, so much runoff is released into the southern portion of the creek that the water pools behind road bridges, being funneled through the undersized culverts beneath the roads (Figures 20–32). In contrast, the northern portions of the creek do not have enough water for even a small minnow to make its way through, the creek is completely dried up in many places, and can barely be seen in most locations (Figures 33–55).

One massive lone old Bur Oak tree (Map 3 (Tree 318); Figures 56, 57) beside the Creditview Sandalwood Park parking lot stands out as the only old tree that exists outside of the Natural Heritage System (NHS) woodlots. Where are the others? Were they destroyed? In fact, no natural features exist outside of this linear NHS. Were they destroyed too? Why?

The roads completely bisect the NHS, creating a huge barrier to terrestrial movement (Map 3; Figures 58–70). To continue on the trail, one must cross the roads. As you continue south, the trail comes to an abrupt end due to a fenced rail crossing (Map 3 (CN Railway); Figure 71), which completely bisects the NHS and Huttonville Creek, with only four small holes in the culvert to allow for water to flow through, and fish (theoretically).

Brampton's Natural Heritage policies, which direct how development will proceed in regard to natural heritage features, are based on various environmental planning approaches including landscape

ecology, ecodesign, green infrastructure, and the ecosystem approach. Yet, the on-the-ground outcomes did not meet the intent of these policies.

Although ecological natural heritage system goals are articulated in plans and policies, my research found a gap between landscape policy and planning practice. Hudson et al. (2019) discuss this policy-implementation gap. They mention that "there is an increasing awareness that policies do not succeed or fail on their own merits; rather their progress is dependent upon the process of implementation" (Hudson et al., 2019, p.1). The many complex factors that influence implementation of policies make this policy-implementation gap a "wicked problem" (Hudson et al., 2019, p.1–2). Biggs et al. (2011, p. 169) also discuss the implementation crisis in conservation planning in terms of a "planning-implementation gap", which is the failure to translate conservation assessments and plans into sustained on-ground outcomes for conservation.

When I began this research, I thought that a planning-implementation gap existed in terms of ecological natural heritage policies. I wished to explore this gap by analyzing the ecological natural heritage system goals as articulated in policies and determining whether they were successfully implemented. In other words, how does the existing landscape compare to these policies? Are the ecological natural heritage goals for new development as articulated in municipal planning policy implemented successfully?

This study found that the Mount Pleasant planning process unfolded in a way that resulted in ecological tradeoffs and a Natural Heritage System that did not meet the intent of NHS policies. Through this analysis, factors that led to the failure to translate natural heritage policies into on-the-ground outcomes were uncovered. The main factor being that decisions were made in the wrong order, for instance, land use and block plans were approved before environmental studies were completed, natural features were only designated for protection after the NHS was finalized, and pivotal decisions that would substantially impact natural features and ecological connectivity were made at the end of the planning process. Other factors that caused the policy-implementation gap included competing land-use plans, insufficient details about existing natural heritage features to make well-informed conservation decisions, Subwatershed Study targets not being met, and not proactively identifying the parties responsible for environmental restoration and management. The overarching finding of this study is that natural heritage policies were not met and ecological tradeoffs resulted due to the underlying capitalist need for Landowners and the City to maximize profits by maximizing developable area for single-detached housing (Malone, 2011, p. 133, 134, 139). While a walk along the trail through

the NHS feels like a natural oasis from the suburban development on either side, this new natural area is a poor imitation of the natural system imagined by policy.

Outline of the Paper

Chapter 1: Introduction: This first chapter has introduced my case study site, Mount Pleasant, Brampton, as well as my research question, and the problem of the policy-implementation gap in planning practice.

Chapter 2: Methodology: This chapter presents my research methodology including site selection, determination of the planning process timeline, field and orthophoto assessments and policy analysis.

Chapter 3: Environmental Planning Approaches: This chapter discusses the environmental planning approaches that provided the intent or goal behind natural heritage policies, and the lens through which I assessed the post-development landscape and policy implementation.

Chapter 4: Findings: Policy vs. Implementation Analysis: This chapter details the findings of my policy-implementation analysis, the assumptions made by the policies, and how and why implementation of these policies fell short.

Chapter 5: Discussion & Recommendations: This chapter provides a discussion of the big factors that led to the policy-implementation gap found in my analysis, and my recommendations to eliminate these factors.

Chapter 6: Conclusions & Future Research: This chapter provides an overview of my findings along with a recommendation to continue future research of the policy-implementation gap in the upcoming Heritage Heights development and to continue future research into overcoming the barriers that limit the implementation of environmental planning approaches.

Chapter 2: Methodology

In order to answer the research question: “Are the ecological natural heritage goals for new development as articulated in municipal planning policy implemented successfully?”, I had to explore how the existing landscape of a new development compares to natural heritage policies. To do this, I chose a new development, Mount Pleasant, Brampton, as case study to explore how a landscape became the way it is. To go about studying the existing landscape, I had to look at the landscape through my own field observations, capture the site through photographs, and observe the landscape using orthophotograph maps. In order to compare this existing landscape to the natural heritage policies that state how the ideal landscape should be, I had to attain and evaluate natural heritage policies outlined in the Brampton Official Plan and the Mount Pleasant Secondary Plan. To unpack and figure out how the planning process unfolded that led to the existing landscape, I had to determine the planning timeline for Mount Pleasant by analyzing numerous municipal planning documents. Environmental planning approaches including landscape ecology, ecodesign, green infrastructure, and the ecosystem approach, provided the underlying intent and goals for the natural heritage policies, these approaches provided lenses through which I compared the intent of natural heritage policies to implementation and on-the-ground outcomes. Overall, in order to determine whether the ecological natural heritage goals for new development as articulated in municipal planning policy are implemented successfully, I had to compare and contrast the natural heritage policies outlined in the Brampton Official Plan and the Mount Pleasant Secondary Plan to the way the actual planning process unfolded and to the existing on-the-ground landscape that resulted from this planning process.

In this way, I undertook an analysis of the policy-implementation gap between natural heritage policies and the implementation of the Mount Pleasant Natural Heritage System. This analysis examined how the planning process unfolded in a way that resulted in a Natural Heritage System that did not meet the intent of natural heritage policies. Through this analysis, I uncovered the factors that led to the failure to translate natural heritage policies into on-the-ground outcomes.

Case Study Site Selection

Development Criteria

In order to determine whether the ecological natural heritage goals for new development as articulated in municipal planning policy are implemented successfully, I had to explore how the existing landscape of a new development compares to natural heritage policies. To do this, I chose a new

development as case study to explore how a landscape became the way it is and how this landscape compares to natural heritage policies. There were various criteria that the development needed to meet in order to be appropriate for my case study.

For my research to be relevant to the current provincial plans and policies, which municipal plans must conform to, this development must be recent. The planning process for the development must have taken place after 2005 when the Provincial Policy Statement was updated, and the Places to Grow Act and Greenbelt Plan took effect (with the subsequent Growth Plan for the Greater Golden Horseshoe taking effect in 2006).

For my research to be meaningful in light of continued urban sprawl, this development must be a primarily residential community development, since there is a pressure for residential development and residential development is the primary driver of sprawl.

In order to compare the final landscape, the on-the-ground outcomes of the planning process, against policies, this development must be in a post-occupancy phase.

Additionally, because this study specifically explores the implementation of ecological goals as articulated in natural heritage policies, this development must have plans that incorporate or designate green infrastructure for ecological functions such as natural heritage system areas, green corridors, greenways, green spaces, ecological buffers, and water courses. I chose these features based on the natural features discussed in the Diamond et al. (2002) report, which were analyzed as part of the natural heritage performance evaluation of the implementation of Amendment 129 to the Richmond Hill Official Plan (OPA 129), which permitted primarily residential development in an area of the Oak Ridges Moraine.

Since this study assesses the implementation of natural heritage policies that reflect environmental planning approaches including landscape ecology, ecodesign, green infrastructure, and the ecosystem approach, all of the main structural elements of a landscape (which underlie these environmental planning approaches) must be present in my chosen site. The main structural elements of a landscape include matrix (the built environment), habitat patches, corridors linking habitat patches, and water courses (Botequilha Leitão & Ahern, 2002, p.72). I chose these elements based on Botequilha Leitão & Ahern (2002) which discusses how to apply landscape ecological concepts in sustainable land use planning and list these main structural elements in the landscape as elements that must be understood (Botequilha Leitão & Ahern, 2002, p.72). They also discuss the importance of understanding the relationship of these elements to physical processes (erosion, water filtration, water infiltration), humans (recreation, aesthetics, services such as flood control, water cleansing), and wildlife (habitat,

conduit for movement, barrier, habitat fragmentation, facilitating encroachment of people or pollution) (Botequilha Leitão & Ahern, 2002, p.72). These main structural elements must be present in my chosen site.

To unpack and figure out how the planning process unfolded that led to the existing landscape, I need to determine the planning timeline for the development. To do this, I need to access and analyze the municipal plans, policies and documents relating to the development. Accessibility to these documents is a main criterion for choosing a development. Documents prepared in support of the development such as conditions of approval, draft plans, development applications, and environmental studies must be accessible for evaluation, these documents were evaluated as part of the natural heritage performance evaluation of the implementation of OPA 129 to the Richmond Hill Official Plan (Diamond et al., 2002, p.5). I will also need access to Subwatershed Studies, Environmental Implementation Reports, Urban Design Guidelines, and any other documents supporting the development process.

To go about studying the existing landscape, I would have to look at the landscape through my own field observations, capture the site through photographs, and observe the landscape using orthophotograph maps. The site must be physically accessible so I can undertake field assessments of the landscape and photo-document conditions, similar to the field assessment and photo-documentation of lands for the natural heritage performance evaluation of the implementation of OPA 129 to the Richmond Hill Official Plan (Diamond et al., 2002, p.5). Recent satellite images or orthophotos of the site with appropriate spatial resolution for assessment of the landscape must exist so that these can be compared with natural heritage policies, development plans, and environmental studies.

Town of Caledon & Milton Prospective Case Study Sites

New developments in Caledon and Milton, Ontario were options for my case study because they met most of the development criteria, however, I decided I could not select a site in either of these municipalities because planning documents were not readily accessible.

Town of Caledon Sites

The initial site of interest for my case study was Mayfield West Phase 1 in Caledon because it met many of the development criteria required for my research. Mayfield West Phase 1 is a new, primarily residential development with green infrastructure for ecological functions including Environmental Policy Areas, a watercourse, and greenway corridors. The planning documents for this

development, however, were very inaccessible, as well as expensive to access. Development documents for past development projects are not accessible on the Town of Caledon's website. I had to make a formal document request to be able to access these documents. Due to this lengthy process, I made another document request for an additional new development of interest in Caledon, the Chateaux of Caledon residential development, however, this site did not end up having any green infrastructure for ecological functions, which was required for my case study.

Through my formal request, I was able to uncover some documents for Mayfield West Phase 1 including the Environmental Impact Study, Comprehensive Adaptive Management Plan, Development Phasing Plan, Property Environmental Impact Statement, Conceptual Land Use Plan, Environmental Advisory Committee Comments on the Mayfield West Comprehensive Environmental Impact Study and Management Plan, Streetscape Planting Plan, Sanitary Drainage Plan, Storm Water Management Pond layouts, Community Buffers documents, TRCA's Comments on the Mayfield West Master Environmental Servicing Plan (MESP), and the Community Design Plan.

I did not acquire any additional documents because a hefty fee must be paid each time records are accessed, and each formal document request takes days to process. Additionally, any of the documents that I did acquire were incomplete because a fee must be paid for each page scanned.

Given the inaccessibility to basic planning documents, I decided that I could not select a development in Caledon for my analysis. While these documents may be inaccessible due to privacy reasons, it makes the planning process for all past developments in Caledon non-transparent.

Town of Milton Sites

Two sites of interest for my case study were the Sherwood Survey Secondary Plan area and the Bristol Survey Secondary Plan area in Milton, Ontario, because they met many of the development criteria required for my research.

The Sherwood Survey Secondary Plan area is a new, primarily residential development with green infrastructure for ecological functions including an expansive greenlands area, environmental linkage area, and escarpment protection area. The Bristol Survey Secondary Plan area is also a new, primarily residential development with green infrastructure for ecological functions with its greenlands and environmental linkage areas. I was able to acquire a few Secondary Plan documents online for each of these areas, however, many documents were not accessible. Given the inaccessibility to basic planning documents, I decided that I could not select a development in Milton for my case study.

Overall, while new developments in Caledon and Milton, Ontario were options for my case

study because they met most of the development criteria, I could not select a site in either of these municipalities because planning documents were not readily accessible.

Selection of Mount Pleasant, Brampton as the Case Study Site

Given the difficulty in obtaining documents and data for Caledon and Milton, I selected Mount Pleasant, Brampton for my case study site. Brampton's planning documents were accessible, and Mount Pleasant met all of the development criteria required for my research.

Mount Pleasant is a good case study because it is a recent example of residential sprawl and the planning process reflects current provincial plans and policies including the Provincial Policy Statement, Growth Plan, and Greenbelt Plan.

Mount Pleasant provides an appropriate landscape for an analysis of natural heritage policy implementation since it has significant green infrastructure designated for ecological functions due to its high-profile and expansive Natural Heritage System.

Mount Pleasant planning documents are accessible, which is necessary because these documents are needed to determine the planning timeline for the development and unpack how the planning process unfolded that led to the existing landscape. Numerous development documents for Mount Pleasant are accessible on the City of Brampton website including the Secondary Plan, Block Plan, Land Use Plan, Draft Land Use Plan, Subwatershed Study, Environmental Implementation Report, Community Development Guidelines, Secondary Plan Compendium Analysis, Secondary Plan Area Transportation Master Plan, as well as numerous Planning, Design and Development Committee reports, Brampton City Council Minutes, OPA documents, Infrastructure Servicing Study presentations, Landscape Scale Analysis & Subwatershed Study presentation boards, Public Notices, Landowner NHS Vignettes, and many more.

By accessing these planning documents, I determined that Mount Pleasant has all of the main structural elements I was looking for in a landscape: matrix (the built environment), habitat patches, corridors linking habitat patches, and a watercourse. The residential zones that primarily make up the Mount Pleasant area provide the matrix that surrounds a large, linear Natural Heritage System, that runs North-South through the Mount Pleasant area (Map 3). A realigned watercourse corridor runs through the NHS, and the NHS consists of various habitat patches including woodlands and wetlands. The NHS is also fragmented by various road crossings (Map 3; Figures 58–70) and a rail crossing (Map 3 (CN Railway); Figure 71), which separates the NHS into smaller patches that are connected by the riparian corridor. Mount Pleasant has all of the main structural elements I was looking for in a landscape and

development.

To go about studying the existing landscape, I would have to look at the landscape through my own field observations, capture the site through photographs, and observe the landscape using orthophotograph maps. The site must be physically accessible so I can undertake field assessments of the landscape and photo-document conditions and recent satellite images or orthophotos of the site with appropriate spatial resolution for assessment of the landscape must exist. Given that trails run alongside and through the NHS, Mount Pleasant is physically accessible for field assessments and photo-documentation of conditions. Additionally, high-resolution orthophotos for the entirety of Brampton for Fall and Spring of each year are provided on the City of Brampton's Geohub website (https://geohub.brampton.ca/), which are easily viewable through ArcGIS Online. High-resolution orthophotos for the entirety of Brampton for Fall and Spring of each year are also available through the Region of Peel.

Given that Mount Pleasant met all of my development criteria, planning documents and orthophotos were accessible, and the site is physically assessible for field assessments, I chose Mount Pleasant for my analysis.

Planning Process Timeline

In order to unpack how the planning process unfolded and determine the decision points that led to the existing landscape, I had to determine the planning timeline for Mount Pleasant by acquiring and analyzing numerous municipal planning documents. Through the creation of this timeline, I would be able to determine whether or not the planning process unfolded as natural heritage policies intended.

I acquired, researched, and analyzed numerous plans, environmental studies and development documents including the Brampton Official Plan, the Mount Pleasant Secondary Plan, draft Block Plans, the final Block Plan, Draft Land Use Plans, the Final Land Use Plan, Subwatershed Study (SWS) , Environmental Implementation Report (EIR), Community Development Guidelines, Secondary Plan Compendium Analysis, Secondary Plan Area Transportation Master Plan, as well as numerous Planning, Design and Development Committee reports, Brampton City Council Minutes, OPA documents, Landowner NHS Vignettes, and many more.

Through this comprehensive analysis of the planning and development documents, I was able to compile a timeline of the Mount Pleasant NHS planning process (Appendix 1). This timeline outlines the studies, meetings, preliminary plans, OPA submissions to the City, OPA Council approvals, OPA

submissions to the Province, and OPA approvals by the Province that led to the creation of the existing Mount Pleasant NHS and landscape.

It was through the creation of this timeline that I was able to determine how the planning process strayed from natural heritage policies, when decisions were made that led to ecological tradeoffs, and how the order in which things were done led to these ecological tradeoffs.

Field Assessments & Photo-Documentation

To go about studying the existing landscape and be able to compare the outcomes of the planning process to natural heritage policies, I had to look at and assess the existing landscape through my own field observations and capture the site through photographs. Photo-documentation of the site is a way to record and visually demonstrate the existing landscape and natural features.

On April 6, May 6, and May 13, 2020, I conducted visual field assessments and photo-documented the Mount Pleasant NHS (Appendix 3). Each visit consisted of a walk-through of the NHS where I assessed the implementation of the NHS policies, NHS plans, and Subwatershed Study (SWS) and Environmental Implementation Report (EIR) mitigation strategies.

My field assessment included visual assessment and photo-documentation of the connectivity of the realigned Huttonville Creek. According to the SWS and EIR, connectivity was supposed to be restored between the southern and northern portions of Huttonville Creek through the creek realignment which was a significant part of the Mount Pleasant development (Stonybrook, 2011a, 2-36, 3-1, 3-2, 4-1, 5-4, 5-19; AMEC, 2010a, p. 260, 308, 377–381, 390). However, I discovered a lack of connectivity remained in the northern portions of Huttonville Creek (Figures 33–55), in comparison to the southern portions of the creek which have stormwater management pond outlets (Figures 20–32).

My field visits also included a visual assessment of the extent of fragmentation of the NHS by the roads and their massive bridge walls at Remembrance Rd, Wanless Dr., Buick Blvd, Sandalwood Parkway, and Veterans Dr (Map 3; Figures 58–70). This included an assessment of how Sandalwood Parkway is now adjacent to Wetland 9 since the road was aligned through the southern portion of the pre-development wetland (Stonybrook, 2011a, p. 3-10) (Map 3 (Wetland 9); Figures 66, 67). I did a visual assessment of the culverts of these roads to determine if the terrestrial benches recommended by the Subwatershed Study (AMEC, 2010b, p. 61–62) and Environmental Implementation Report (Stonybrook, 2011a, p. 10-9–10-11) were implemented, and found that these linkages were not implemented at Sandalwood Parkway or Veterans Dr (Figures 24, 29). Additionally, even though terrestrial benches were

present at Remembrance Rd, Wanless Dr., and Buick Blvd (Figures 72–74), the culverts are very small relative to the bridge walls, thus, these roads still create a large barrier to terrestrial species movement.

I also did an assessment of the CNR culvert to determine if the EIR-recommended terrestrial benches were implemented (Stonybrook, 2011a, p. 10-12–10-14). I found that these linkages were not implemented (Figure 71). I also assessed the CNR rail culvert to determine if the EIR CNR culvert designs to mitigate the existing impediment to upstream fish migration created by the existing CNR culvert were implemented (Stonybrook, 2011a, p. 10-13–10-14). While a design that improved connectivity compared to the existing culvert was implemented, neither of the EIR designs were implemented (Figure 71). The chosen culvert design creates a greater barrier to fish movement in comparison to the Environmental Implementation Report designs.

I also assessed how the trails fragment habitat in the NHS. For instance, a trail completely fragments Mayfield Woodland A (Figure 75). Additionally, other pedestrian trails completely keep natural heritage features from ever connecting into larger habitat patches. For instance, the trails between the three Park Woodlands will keep them fragmented (Map 3; Figures 76, 77). I also noticed how the trails throughout the NHS provide opportunities for people to dump garbage into the NHS (Figure 78).

Additionally, I assessed the 'tooth' area (Map 3) that was meant to be a wetland creation site to "replace" the functions lost by the removal of other wetland areas, according to the SWS and EIR (Stonybrook, 2011a, p. 3-10, 5-17, 5-18, 5-19, 13-24; AMEC, 2010a, p. 396–397; AMEC, 2010b, p. 63). I discovered that this area remains as a Regenerating Meadow, not a wetland (Figures 79–85). The educational signage at the site even refers to the "tooth" as a wetland area, however, it is clearly a Regenerating Meadow with just a ditch to the east of it between it and the Park Woodland C (Figures 86–89). Thus, I discovered the wetland restoration was never implemented.

The field visits also allowed me to view and photograph the 1 tree out of the 491 trees outside of the NHS that was chosen to be conserved in the Vegetation Conservation Plan component of the EIR (Map 3 (Tree 318); Figures 56, 57) (Stonybrook, 2011a, p. 7-1,7-2, 2-45; Kuntz, 2011, p. 5, 6, 8). I saw that no protective fencing was implemented around this tree, as the Vegetation Conservation Plan stated was to be implemented as a protective mitigation strategy (Kuntz, 2011, p. 8).

The walk-throughs also gave me an understanding of how the NHS is a heavily engineered piece of green infrastructure. The prominence of the stormwater management (SWM) ponds and SWM infrastructure and outlets into the realigned creek (Map 3 (HE-1–5); Figures 11–19), as well as erosion infrastructure such as erosion stabilizer grids (Figures 54, 55), serve as reminders that the creek's

primary function is to accommodate this post-development runoff. Educational signage also serves as reminders that Huttonville Creek is completely realigned (Figures 91, 92) and the NHS is engineered (Figures 91–94).

Additionally, the fact that the riparian vegetation in the NHS consists of large amounts of the highly invasive Phragmites (Figures 20, 48), and the woodlands have highly invasive Common Buckthorn and Garlic Mustard present (Figure 95), gives off the impression that the NHS is meant to have a natural "aesthetic" but not support biodiversity. The presence of mainly generalist wildlife species often found utilizing urban areas for their habitat such as geese, mallard ducks, robins, seagulls, and red-winged blackbirds, also demonstrates that the NHS is not really meant to protect sensitive species or those of conservation importance or support a broader range of biodiversity, but rather, provide enough habitat for generalist species.

Overall, through my own field observations and photo-documentation, I gained an understanding of the existing landscape, which I was then able to compare to natural heritage policies.

Orthophoto Assessments

To go about studying the existing landscape and be able to compare the outcomes of the planning process to natural heritage policies, I had to observe and assess the existing landscape using orthophotograph maps. I conducted orthophoto assessments using the most recent Spring 2019 Orthophoto on the City of Brampton's Geohub (https://geohub.brampton.ca/) and the Spring 2019 Orthophoto from the Region of Peel.

I assessed the orthophotos to determine how the NHS fits into the broader natural landscape. It was clear that the north-south linear nature of the NHS does not provide much east-west connectivity to the broader region (Map 3). Mayfield Road at the northern boundary of the NHS, and the CNR and Bovaird Dr. at the southern boundary of the NHS, also create a barrier to connectivity north and south of the NHS (Map 3). The orthophoto also made it easy to detect where and how the NHS and its natural features are fragmented by roads, the CNR, and trails (Map 3).

I also used the distance measuring tool in ArcGIS Online on the Spring 2019 Orthophoto to confirm that the proposed buffer widths for wetlands and woodlands were implemented (Stonybrook, 2011c). The southern portion of Wetland 9 did not have a buffer present; however, a buffer was never proposed for this area due to the alignment of Sandalwood Parkway (Stonybrook, 2011c).

The orthophoto was very useful to compare against maps of the pre-existing landscape, land use plans, block plans, and other concept maps and designs to confirm the natural features that were

removed during the development and how the creek was realigned. I also viewed the previous years' Fall and Spring Orthophotos back until 2005 to get an understanding of how the landscape changed temporally and as development began in Fall 2011 and progressed years later.

The orthophoto assessment allowed me to gain a better understanding of the existing landscape and enabled me to compare the outcomes of the planning process to natural heritage policies.

Policy Analysis

In order to analyze the implementation of natural heritage policies, the on-the-ground outcomes, I had to understand and analyze Official Plan and Secondary Plan policies that directly outline how development should proceed in the municipality. These municipal-level policies conform to higher level policies including those from the Region of Peel Official Plan, Growth Plan, and Provincial Policy Statement, thus, reflect higher level natural heritage policy.

I reviewed the 2006 Official Plan (in effect during the Mount Pleasant planning process) to determine the relevant policy sections for my policy-implementation gap analysis. Given that the purpose of my paper is to analyze the policy-implementation gap for natural heritage policies, I chose to analyze the policies in Section 4.5 "Natural Heritage and Environmental Management". These policies outline how development should proceed in regard to natural heritage and environmental management. Given that the policies in Section 4.14 "North West Brampton Urban Development Area" outline how development in regard to environmental planning should proceed for Mount Pleasant, including the stages of planning approvals that must be realized, I also chose to analyze this section.

I also reviewed the Mount Pleasant Secondary Plan to determine the relevant policy sections for my policy-implementation gap analysis. I chose Natural Heritage System, Road, and Community Block Plan policies, all of which outline how development should proceed regarding the natural heritage system.

I identified the policy implementation gaps by comparing and contrasting the policies to the implementation of the NHS. In this way, I was also able to determine why these shortcomings came to be. For each of these policy sections, I analyzed the intent of the policies and the assumptions made by these policies. I contrasted the policy intentions and assumptions with my constructed timeline of how the planning process unfolded, the shortcomings of environmental studies, the decision points that led to ecological tradeoffs, and with the existing post-development NHS (as determined through my field and orthophoto assessments).

I also used various environmental planning approaches including landscape ecology, ecodesign,

green infrastructure, and the ecosystem approach, each of which were reflected in the intent of many of the policies, to provide a lens through which I analyzed the NHS planning process and post-development landscape.

Chapter 3: Environmental Planning Approaches

My findings demonstrate that Brampton's policy framework reflects the scholarship on environmental planning. However, the planning process is where the policy-implementation gap makes itself evident. In this chapter, I briefly review the policy framework for the Mount Pleasant study area, and then evaluate the framework using scholarship on environmental planning. In my review of the scholarship, I draw upon work from landscape ecology, theories of ecodesign, the green infrastructure concept, and the ecosystem approach. Based on my review of the literature, these are the main approaches that contemporary environmental planning draws upon.

Brampton's Mount Pleasant Policy Context

As with every lower-tier municipality in Ontario, Brampton must conform with the Provincial Policy Statement, Growth Plan, and its higher-tiered Regional Official Plan (in Brampton's case, the Region of Peel Official Plan). This higher-level land use planning legislation provides policies on how land use planning will proceed, and the Brampton Official Plan and its Secondary Plans must conform with these policies.

The policies concerning natural heritage in the Provincial Policy Statement, Growth Plan, and the Region of Peel Official Plan consist of very broad statements. I refer to the plans and legislation in effect during the planning of the Mount Pleasant Secondary Plan to demonstrate examples of these broad natural heritage policies:

The PPS (2005) policy 2.1.1 states: "*Natural features and areas shall be protected for the long term*". Policy 2.1.2 states: "*The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features*". Policy 2.1.3 states: "*Development and site alteration shall not be permitted in: a) significant habitat of endangered species and threatened species; b) significant wetlands in Ecoregions 5E, 6E and 7E1…*".

The Growth Plan (2006) policy 4.2.1 states: "*Through sub-area assessment, the Minister of Public Infrastructure Renewal and other Ministers of the Crown, in consultation with municipalities and other*

stakeholders will identify natural systems for the GGH, and where appropriate develop additional policies for their protection" and "*Planning authorities are encouraged to identify natural heritage features and areas that complement, link, or enhance natural systems*".

The Region of Peel Official Plan (2005) policy 2.1.3.1 states: "*Rationalize the regulatory framework for the natural environment across the Region on an ecosystem basis, jointly with the area municipalities, conservation authorities and provincial agencies, to increase the defensibility and effectiveness of protection measures*". Policy 2.1.3.2 states: "*Protect, maintain and enhance the quality and integrity of ecosystems, including air, water, land and biota jointly with the area municipalities, conservation authorities and provincial agencies*". Policy 2.2.2.1 states: "*Study and protect the overall integrity of Peel's ecosystems which are part of larger biotic (living) and abiotic (non-living) systems*". Policy 2.5.2.1 states: "*Promote a wide range of environmental enhancement and restoration opportunities*".

While the PPS, Growth Plan, and Region of Peel Official Plan have been subsequently updated since the Mount Pleasant planning process, their policies still contain these types of broad statements that are in no way measurable and in no way outline specifically how the planning process should unfold in order to uphold the intent of these policies. While these policies "sound nice" and seem too say the right thing and their intention reflects the environmental planning approaches I will discuss in the upcoming sections, the policies are so broad that they can be met (or claimed to be met) during implementation no matter how the planning process unfolds.

Brampton's Official Plan (2006) contains natural heritage policies that conform with the PPS, Growth Plan, and Region of Peel Official Plan. Given that the higher-tiered policies are so broad, the Brampton Official Plan's natural heritage policies follow suit with non-specific, immeasurable policies that do not specifically guide how the planning process should unfold. Instead, the Brampton Official Plan's natural heritage policies "say all of the right things" in terms of their intent which reflects the environmental planning approaches to be discussed in the following sections, however, there is a gap between these policies and the on-the-ground outcomes for Mount Pleasant, which I demonstrate in Chapter 4.

Finally, the Mount Pleasant Secondary Plan was added to the Brampton Official Plan to establish "a policy framework and direction for detailed land use planning to guide the future development of a new community" (Brampton, 2010b, p.4), this community being Mount Pleasant. However, the Mount Pleasant Secondary Plan was not a guide for the development of the Mount Pleasant community. Instead, the Mount Pleasant Secondary Plan was created during the development planning process.

Thus, the policies of the Secondary Plan did not shape the development, instead the policies were outcomes of the development planning process. These policies reflected what was already decided to be built on-the-ground, they did not shape what would be built. Similar to the natural heritage policies in the Brampton Official Plan, the natural heritage policies in the Mount Pleasant Secondary Plan reflected the environmental planning approaches discussed in the upcoming sections. However, there is a gap between these policies and the on-the-ground outcomes for Mount Pleasant, which I demonstrate in Chapter 4.

Environmental Planning Literature

I evaluated the policy framework for the Mount Pleasant study area using scholarship on environmental planning. In my review of the scholarship, I draw upon work from landscape ecology, theories of ecodesign, the green infrastructure concept, and the ecosystem approach. Based on my review of the literature, these are the main approaches that environmental planning has to draw upon.

Landscape Ecology

Landscape ecology as an approach to doing environmental planning, played a significant role in the planning of the Mount Pleasant NHS and in my research. Key ideas from landscape ecology such as habitat patches and linkages, are clearly reflected in the natural heritage policy and the built landscape.

Landscapes are spatially heterogeneous areas characterized by a mosaic of patches that differ in size, shape, and contents (Wu, 2013, p 181). Landscape ecology is the science of studying and improving the relationship between spatial pattern and ecological processes in a landscape on multiple scales (Wu, 2013, p. 179, 181).

Landscape ecology became an internationally recognized field of study in the 1980s when theoretical developments in spatial ecology and technological advances in remote sensing and geospatial information systems emerged (Wu, 2013, p. 181). The publication of the "Landscape Ecology" textbook by Richard Forman and Michel Godron in 1986 further established landscape ecology as a new discipline and laid out its fundamental principles (With, 2019, p. 4; Wu 2013, p 181; Forman & Godron, 1986).

Landscape ecology principles are based on mosaics and the patch-corridor-matrix model (Forman, 1995, p.3), which regard the landscape as being made of a mosaic of heterogenous patches and corridors and the matrix (Forman, 1995, p. 3, 4, 7, 11; Wu 2013, p. 180). In urban and suburban landscapes, the "human dominated area" is the matrix, since its functions dominate those of remnant natural environments (Diamond et al., p. 8–9). This matrix creates landscape resistance, which is "the

effect of structural characteristics of a landscape impeding the rate of flow of objects (species, energy, and material)" (Forman, 1995, p. 279). In other words, this matrix of "human dominated area" surrounds habitat patches, which isolates them from each other, and influences ecological processes including species populations (Dramstad et al., 1996, p. 19). The landscape ecology approach to environmental planning has the goal to improve sustainability and conservation outcomes through the study of the relationship between spatial pattern and ecological processes (Wu, 2013, p. 179, 181) and through landscape ecology principles:

- Larger habitat patches (in comparison to smaller habitat patches) allow for a larger interior habitat, which supports greater population sizes of interior species which are often of conservation importance. Larger habitat patches also reduce local extinction, increase habitat diversity, and decrease edge effects including negative impacts from the surrounding matrix (Dramstad et al., 1996, p. 20)
- Habitat patches that are more circular in shape are more ecologically "optimum" rather than linear or convoluted patch shapes since these shapes have a higher proportion of edge habitat, thereby slightly increasing the number of edge species, but increasing edge effects including decreasing the number of interior species, including those of conservation importance, and also increasing negative interaction with the patch and the surrounding matrix (Dramstad et al., 1996, p. 31–32)
- Connectivity between habitat patches through corridors or smaller "stepping-stone" patches facilitates species movement which supports population viability and biodiversity (Dramstad et al., 1996, p. 35). In some cases, having continuous corridors, such as a continuous stream corridor, without major gaps, is essential to maintain aquatic conditions and viable fish, and other aquatic species populations (Dramstad et al., 1996, p. 40).
- Buffer zones around a protected habitat area can reduce the negative impacts from the surrounding matrix (Dramstad et al., 1996, p. 28, 44, 50).
- Removal of a patch causes habitat loss, which reduces the population size of a species dependent upon that habitat type, and can reduce habitat diversity, leading to fewer species. Removal of a patch also reduces the size of species metapopulations (Dramstad et al., 1996, p.22)
- Isolated patches have an increased probability of a species going locally extinct and will have a lower chance of being (re-)colonized than a less isolated patch. (Dramstad et al., 1996, p. 24)

In practice, landscape ecology principles have become important to land-use planners in terms their application in landscape design and planning (Dramstad et al., 1996, p. 6–7). Planners can implement landscape ecology principles to weave together the mosaic of habitat patches and corridor networks, to allow for an ecologically functioning landscape in a human-dominated matrix (Dramstad et al., 1996, p. 6).

Landscape ecology played a significant role in the planning of the Mount Pleasant NHS and in my research. The Brampton Official Plan defines a Natural Heritage System as "a system made up of natural heritage features and areas, linked by natural corridors which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species and ecosystems" (Brampton, 2006, p. 5–9). Natural Heritage Systems are based on landscape ecology principles.

The vision of the Mount Pleasant Natural Heritage System and its related policies is to achieve ecologically responsible urban development. The planning approach to identifying and protecting this NHS takes place "through a combined landscape-scale and feature-based analysis that addresses the diversity, connectivity, and ecological features and functions and associated linkages of terrestrial and water features" (Brampton, 2010b, p. 7). My research focuses on analyzing this planning approach to assess whether the intent of the NHS related policies was achieved during implementation of the Mount Pleasant NHS. Landscape ecology provided the major lens through which I assessed the landscape and determined policy-implementation gaps.

During my research I found that the landscape ecology principles outlined in policies and the planning process of the NHS, and the recommendations of the Landscape Scale Analysis and Subwatershed Study based in landscape ecology principles, were not always implemented in practice:

While the creation of the NHS did connect some fragmented habitat patches, many habitat patches were destroyed, and some habitat patches were made smaller (Stonybrook, 2011a, p. 2-72, 2-75, 7-1, 7-2, 13-25; AMEC, 2010b, p. 68; Kuntz, 2011, p. 8), in order to maximize developable area (Malone, 2011, p. 133, 134, 139). Additionally, the NHS and habitat patches are fragmented in many areas by roads (Map 3; Figures 58–70), trails (Map 3; Figures 75–77), and the CN railway (Map 3; Figure 71), and linkage opportunities to mitigate some of this fragmentation fell short (Figures 71–74).
The SWS recommended and provided guidance for the creation of a well-defined, continuous watercourse corridor that would connect the previously fragmented watercourse to provide better connectivity and migration opportunities for fish and other aquatic species between the northern and southern portions of the creek (Stonybrook, 2011a, 2-36, 3-1, 3-2, 4-1, 5-4, 5-19; AMEC, 2010a, p. 260, 308, 377–381, 390). This was the justification behind the creek lowering and realignment. However, my

field visits determined that while the southern portions of the creek are very continuous due to the water input provided by the stormwater management ponds (Figures 20–32), the northern portions of the creek still remain fragmented (Figures 33–55).

Additionally, the SWS (and the associated Landscape Scale Analysis (LSA)) recommended the NHS have connectivity with the broader region (AMEC, 2010a, p. 318–320, 401–403), however, the north-south linear nature of the NHS does not provide much east-west connectivity to the broader region. While Credit Valley Conservation (CVC) originally conceptualized an east-west linkage area across the northern portion of the Secondary Plan area, this was deemed as "impractical", "would conflict with other important objectives", "would not be effective due to fragmentation by roads" and "existing east-west linkage is already created by the Etobicoke Creek valleylands north of the Mount Pleasant Community in the Town of Caledon" (AMEC, 2010a, p. 403). In this way, an east-west linkage was not encouraged or supported. Mayfield Road at the northern boundary of the NHS (Map 3; Figure 96), and the CN railway (Map 3; Figure 71) and Bovaird Dr. (Map 3) at the southern boundary of the NHS, also create a barrier to connectivity north and south of the NHS.

The engineered linear shape of the NHS, in order to minimize NHS area which would maximize developable area, gives the NHS a higher proportion of edge, which increases edge effects including impacts from the outside matrix. Buffers were also not always utilized to protect sensitive natural features such as wetlands.

While many of the key ideas from landscape ecology are clearly being applied to planning new suburban environments, and are reflected in natural heritage policy, Forman would be disappointed to learn that landscape ecology principles are not always being implemented on-the-ground. While the scholarship on landscape ecology theory is well-established, and landscape ecology principles provide very clear-cut practical guidelines to environmental planning, economic and social factors often take precedent over these principles. Fewer habitat patches, and smaller, linear habitat patches may not be sound in terms of landscape ecology theory, however, they are consistent economically, since they allow developable area for single-detached housing to be maximized. This would maximize landowners' profits, and the lower density housing generates significantly more tax revenue to support City services per capita, while having less NHS area means less maintenance costs for the City (Malone, 2011, p. 133, 134, 139). Additionally, in a car-dependent world, gridded by main roads approximately every half kilometer, habitat fragmentation is inevitable.

Forman would not be impressed to know that landscape ecology ideas of connectivity are not entirely being used for their original intent and are even being used as justification to destroy existing

habitat patches and corridors. For instance, realigning Huttonville Creek and engineering a new NHS along the creek were justified by the idea that the new NHS would connect the fragmented habitat patches of the Mount Pleasant area and restore ecological connectivity, according to the SWS and EIR. However, the channel realignment and creation of the new NHS, resulted in the destruction of existing watercourse corridors and habitat patches including wetlands and woodlands that did not fall within this pre-conceived NHS alignment (Stonybrook, 2011a, p. 2-72, 2-75, 7-1, 7-2, 13-25; AMEC, 2010b, p. 68; Kuntz, 2011, p. 8). The intent of landscape ecology theory to maintain and restore ecological connectivity was morphed in a way that would justify creating one linear NHS, not to maximize developable area for economic gain, but for the sake of restoring "ecological connectivity".

Ecodesign

Ecodesign as an approach to doing environmental planning, played a significant role in the planning of the Mount Pleasant NHS and in my research. Key ideas from ecodesign such as inventorying existing natural features and restrictively zoning natural heritage areas, are clearly reflected in the natural heritage policy and the built landscape.

Ecodesign is a framework used by Jonathan Barnett and Larry Beasley to challenge the urban growth patterns that are not compatible with and destabilize natural landscapes. In other words, ecodesign means to plan and design with natural landscapes, rather than against them (Barnett & Beasley, 2015, p. 52, 58).

The ecodesign framework recognizes that the construction of new developments occurs after a complicated and often contentious official approval process, but what gets built on the ground often ignores the complex processes of the natural environment (Barnett & Beasley, 2015, p. 58). The goal of ecodesign is to integrate planning and urban design with environmental conservation, but to also design our built environment to adapt to climate change and create more desirable places to live (Barnett & Beasley, 2015, p.140). In other words, ecodesign integrates considerations of environmental soundness and resilience with human health and well-being (Barnett & Beasley, 2015, p. 153). Ecodesign demonstrates how cities need to be built in a way that creates harmony between urban systems and natural systems and contributes to human experience and social life (Barnett & Beasley, 2015, p.153). Ecodesign applies an understanding of ecosystems to the design and development process in a way that incorporates human beings as a part of that ecosystem without diminishing it or dominating it (Barnett & Beasley, 2015, p.153, 168).

Pioneering ecodesign was Ian McHarg with his book Design with Nature, first published in 1969

(Barnett & Beasley, 2015, p.927). McHarg brought forth the case that planners should work with natural systems and not try to construct against them (Barnett & Beasley, 2015, p.927). For instance, McHarg wrote about the natural organization of watersheds and how buildings that destabilize hillsides and wetlands along river basins produced unnecessary erosion and floods, the consequences of designing against nature (Barnett & Beasley, 2015, p.933).

Barnett and Beasley adopted this concept of designing with nature, explaining that clearing natural landscapes of natural vegetation and regrading them to meet preconceived engineering requirements should be understood as bad planning (Barnett & Beasley, 2015, p. 258, 264). Instead, planners should integrate the fundamental principles of environmental protection and respect existing natural systems (Barnett & Beasley, 2015, p.272, 314). This is especially true of watershed systems that have evolved to deal with flooding. Channel realignment is a common occurrence when a new development is being built and altering this natural system would disrupt habitat and natural flood control (Barnett & Beasley, 2015, p. 995). By designing with natural watershed systems, and retaining stormwater within them, the flood and erosion problems associated with reengineered environments can be minimized (Barnett & Beasley, 2015, p.995, 1002, 1029). This is especially important as urbanization increasingly covers land with impermeable surface, and climate change contributes to larger storm events and flooding (Barnett & Beasley, 2015, p. 1029).

In order to design with nature rather than against it, McHarg's recommendation was to make an environmental inventory which would be mapped in advance of all construction so that development could be kept away from unsuitable locations (Barnett & Beasley, 2015, p.933). In this way, Ian McHarg's goal to design with nature will have to become a basic principle of development regulation (Barnett & Beasley, 2015, p.1945).

The ecodesign framework supports incorporating environmental mapping into development regulations (Barnett & Beasley, 2015, p. 962). Today, Geographic Information Systems (GIS) can be used to demonstrate conservation priorities, such as natural habitats and corridors that should be conserved from development. (Barnett & Beasley, 2015, p.947). GIS makes it possible to define environmental zones such as riparian areas, water quality protection zones, wetlands, woodlands, and flood and flood-surge zones, which can be added to the regulatory text and the official map and zoned in a restrictive zoning designation to be protected from development (Barnett & Beasley, 2015, p. 969). Based on these inventories, policies can also be established to lead to improved prescriptions for new development in order to protect natural areas (Barnett & Beasley, 2015, 962). In other words, a consciousness of the environment will have been built directly into the land use plan for a new development (Barnett &

Beasley, 2015, p. 969).

While the term "ecodesign" did not appear in the Mount Pleasant planning documents, the policies and planning process of identifying and protecting a NHS to be restrictively zoned from development "through a combined landscape-scale and feature-based analysis that addresses the diversity, connectivity, and ecological features and functions and associated linkages of terrestrial and water features" (Brampton, 2010b, p. 7) reflects the ecodesign framework of inventorying natural features and protecting them from development, designing with them rather than against them.

My research focuses on analyzing this planning approach to assess whether the intent of these policies was achieved during implementation of the Mount Pleasant NHS. Ecodesign provided a major lens through which I assessed the landscape and determined policy-implementation gaps.

During my research I found that the ecodesign framework reflected by the policies and the planning process of the NHS, fell short severely in practice:

Regrading natural landscapes to meet preconceived engineering requirements is not supported by the ecodesign framework, yet Huttonville Creek was almost entirely realigned and lowered in order to maximize developable area (Malone, 2011, p. 133, 134, 139) and fulfill post-development stormwater drainage functions (Malone, 2011 p. 121–124; Stonybrook, 2011a, p. 4-7–4-9). The watercourse realignment allowed the creek to become the "spine" for a linear, minimized NHS (Stonybrook, 2011a, p. 4-1), and any natural feature outside of this preferred NHS configuration was subsequently destroyed (Stonybrook, 2011a, p. 2-72, 2-75, 7-1, 7-2, 13-25; AMEC, 2010b, p. 68; Kuntz, 2011, p. 8). Although the natural features of the area were inventoried, it did not mean that they would end up being unaltered or conserved in the final NHS. In this way, the Mount Pleasant NHS was designed against nature, not with it.

While many of the key ideas from ecodesign are clearly being applied to planning new suburban environments, and are reflected in natural heritage policy, the ecodesign framework is not always being implemented on-the-ground. While the scholarship on ecodesign provides a very practical guideline to environmental planning: inventory existing natural features and protect these features, economic and social factors often take precedent over this simple framework. Numerous environmental studies can be done to inventory the existing natural features of an area to be developed, but if these features get in the way of maximizing developable area for economic gain, they will be destroyed.

The intent of natural feature inventories to protect existing natural features, the main tenet of ecodesign, seems to have been morphed into a justification that environmental inventories alone are enough. The fact that it is claimed that the Mount Pleasant NHS will be determined "through a

combined landscape-scale and feature-based analysis that addresses the diversity, connectivity, and ecological features and functions and associated linkages of terrestrial and water features" (Brampton, 2010b, p. 7), through the numerous environmental studies done such as the Landscape Scale Analysis and Subwatershed Study, creates a façade that because so many studies were done, the outcome for the NHS will be ecologically sound and the existing natural features will be protected. However, my research reveals that these inventories do not ensure that natural features will be protected, nor are the results of these inventories always even considered when deciding which features to preserve as part of the new NHS. McHarg would be disappointed to know that just the fact that a natural feature inventory was done, is being used to falsely "prove" that good environmental planning must have been done. Meanwhile, existing natural features are being destroyed despite the inventories.

Green Infrastructure

The concept of green infrastructure as an approach to doing environmental planning, played a significant role in the planning of the Mount Pleasant NHS and in my research. Key ideas from green infrastructure concepts such as green networks of core and linkage areas to provide ecological services, and the engineering of green spaces, are clearly reflected in the natural heritage policy and the built landscape.

Green infrastructure is an interconnected network of natural areas and engineered green spaces that conserve ecosystem values, functions and services, supporting both humans and wildlife (Eisenman, 2013, p. 287, 288; Benedict & McMahon, 2006, p.1; Wright, 2011, p. 1006; Dapolito Dunn, 2010, p. 43).

Frederick Law Olmsted played a significant role in pioneering green infrastructure (Eisenman, 2013). "Olmsted viewed a physically linked system of vegetated spaces and corridors—green infrastructure—as essential in shaping urban expansion across time and space." (Eisenman, 2013, p. 299). In other words, this interconnected network of green spaces integrated into the city fabric would work in tandem with land development and manage future growth by providing the ecosystem services required for the residents of the city while providing habitat for wildlife (Eisenman, 2013, p. 295, 297).

In his creation of park systems for Boston and Buffalo, Olmsted set precedents for "hubs" (core areas) and "links" (corridors) that make up green infrastructure networks. Core areas include large parks, preserves, and working lands, in other words "habitat patches" according to landscape ecology (Eisenman, 2013, p. 298).

Links are the vegetated corridors that connect the hubs and can serve as biological conduits for wildlife, ecosystem processes such as flood management in riparian areas, and opportunities for

outdoor recreation (Eisenman, 2013, p.298). Green infrastructure networks are clearly embedded in the same principles as landscape ecology (Ahern, 2007, p. 267–270).

Similar to the ecodesign framework, green infrastructure looks at conservation in concert with or before land development, natural areas can be identified for preservation and development can be planned in ways that meet the needs of both nature and people (Benedict &McMahon, 2006, p. 2; Eisenman, 2013, p. 288). In this way, natural lands have the same status as other physical urban elements such as gray infrastructure during the land use planning process (Eisenman, 2013, p. 288).

Although natural green space is considered green infrastructure, the term "green infrastructure" often tends to refer to engineered green spaces that often serve an anthropogenic purpose, usually in terms of stormwater management (Dapolito Dunn, 2010, p. 43, 44; Matthews et al., 2015, p. 156). Urban expansion causes large swaths of land to be paved over, the impermeable surface results in stormwater runoff, hence, increased possibility of flooding and pollution delivered to natural features such as streams and aquifers (Matthews et al., 2015, p. 156; Benedict &McMahon, 2006, p.65; Dapolito Dunn, 2010, p. 42, 43). To manage this runoff and flooding, storm sewer systems were traditionally used (Dapolito Dunn, 2010, p. 46). However, it has now become common to use green infrastructure, such as constructed stormwater management ponds or wetlands to manage this runoff (Dapolito Dunn, 2010, p. 46).

This human-engineered or environmental restoration aspect of the green infrastructure concept means that green infrastructure can have a natural aesthetic but be anything but natural (Eisenman, 2013, p. 292). For instance, Olmsted's iconic Central Park which has a natural aesthetic, was formed completely through human engineering with draining, road cutting, planting, brush cutting, digging artificial ponds, creating scenic views, and collecting stormwater, in this way green infrastructure can be purely functional (Eisenman, 2013, p. 292, 293). This heavily engineered approach, however, can actually restore ecosystem functioning and services to a degraded landscape, for instance, using the appropriate plants to help filter stormwater in man-made reservoirs or wetlands that allows for clean water to be released, and allowing for flood-control (Eisenman, 2013, p. 292, 293). In this way, human engineered green infrastructure or "environmental restoration" is an ''offensive'' and ''opportunistic'' strategy that seeks to rebuild disturbed or fragmented landscapes in order to provide ecosystem services where they do not exist (Ahern, 2007, p. 271, 274 via Eisenman, 2013, p. 293).

While the term "green infrastructure" did not appear in the Mount Pleasant planning documents, the policies and planning process of identifying and protecting a NHS to be restrictively zoned from development "through a combined landscape-scale and feature-based analysis that

addresses the diversity, connectivity, and ecological features and functions and associated linkages of terrestrial and water features" (Brampton, 2010b, p. 7) reflects the green infrastructure perspective, the NHS itself is a green infrastructure network. Additionally, the NHS policies related to environmental restoration and enhancement and the human engineered environmental restoration approach to creating the Mount Pleasant NHS were heavily rooted in green infrastructure concepts.

My research focuses on analyzing the Mount Pleasant planning approach to assess whether the intent of the of NHS policies was achieved during implementation. Green infrastructure provided a major lens through which I assessed the landscape and determined policy-implementation gaps.

During my research I found that green infrastructure theories, specifically those regarding human-engineered environmental restoration, were heavily reflected by the policies and the planning process of the NHS. However, while the implementation of these theories accommodated the anthropogenic ecosystem services, there were ecological tradeoffs and shortcomings for wildlife:

Huttonville Creek was almost entirely realigned and lowered in order to maximize developable area (Malone, 2011, p. 133, 134, 139) and fulfill post-development stormwater drainage functions (Malone, 2011 p. 121–124; Stonybrook, 2011a, p. 4-7–4-9). The watercourse realignment allowed the creek to become the "spine" for a linear, minimized NHS (Stonybrook, 2011a, p. 4-1). Stormwater management ponds were engineered along the creek to collect stormwater runoff from the post-development landscape to be released into the creek (Map 3 (HE-1–5); Figures 11–19). Essentially the creek was engineered into an above-ground storm sewer with a natural aesthetic. While the green infrastructure perspective supports an environmental restoration approach to heavily fragmented landscapes, the fact that many existing natural features, such as the existing creek reaches and associated wetlands, that already provided ecosystem services and wildlife habitat, were altered and removed to accommodate the channel realignment, meant that existing natural green infrastructure and habitat was destroyed (Stonybrook, 2011a, p. 2-72, AMEC, 2010b, p. 68).

Similarly, the removal of the existing wetlands to accommodate the channel realignment was apparently justified by the fact that new wetlands could be created elsewhere to "replicate" the same functions, as stated in the SWS and EIR (Stonybrook, 2011a, p. 3-10, 5-17, 5-18, 5-19, 13-24; AMEC, 2010a, p. 396–397; AMEC, 2010b, p. 63). While wetland creation is a part of green infrastructure practice, using it as justification for removal of existing natural green infrastructure is questionable. Additionally, while a newly created wetland was built south of Sandalwood Parkway (Map 3 (Created Sandalwood Wetland); Figures 91, 92, 97) to "replicate" the functions of removed wetlands, the other major proposed wetland restoration in the "tooth" area that was also supposed to replicate the

functions of the lost wetlands, was never implemented (Map 3 (Tooth); Figures 79–85) (Stonybrook, 2011a, p. 3-10, 5-17, 5-18, 5-19, 13-24; AMEC, 2010a, p. 396–397; AMEC, 2010b, p. 63).

The realignment and lowering of the creek was also meant to fulfill the SWS recommendation to create a well-defined, continuous watercourse corridor that would connect the previously fragmented watercourse to provide better connectivity and migration opportunities for fish and other aquatic species between the northern and southern portions of the creek (Stonybrook, 2011a, p. 2-36, 3-1, 3-2, 4-1, 5-4, 5-19; AMEC, 2010a, p. 260, 308, 377–381, 390). In this way, the realignment and lowering would not only support post-development stormwater management, but also support wildlife. However, my field visits determined that while the southern portions of the creek are very continuous due to the water input provided by the stormwater management ponds (Figures 20–32), the northern portions of the creek still remain fragmented (Figures 33–55).

In terms of accommodating urban growth, the realignment and lowering of Huttonville Creek ultimately allowed for a greater developable area for residential purposes, while still integrating the creek and the NHS as a greenspace for ecological services, especially post-development stormwater management. In this way, the realignment and lowering of the creek is consistent with the goals of green infrastructure to accommodate the growth of cities, while providing ecosystem services to both humans and wildlife. However, the creek realignment and the loss of existing natural green infrastructure to accommodate a greater developable area, resulted in a reduced NHS area, meaning a smaller green infrastructure network, and less habitat for wildlife.

While many of the key ideas from a green infrastructure perspective are clearly being applied to planning new suburban environments, and are reflected in natural heritage policy, the original intent of green infrastructure is not always being implemented on-the-ground. While the scholarship on green infrastructure demonstrates how ecological functions and services can be restored in highly-degraded landscapes through human engineered greenspace, my research shows how green infrastructure can be (mis)used to justify the destruction of existing natural features since they can be “replicated” elsewhere. Additionally, while the scholarship discusses how a green infrastructure approach can conserve ecosystem values, functions and services to support both humans and wildlife, my research demonstrates that this original intent has been skewed in favour of anthropogenic ecosystem services, with disastrous ecological tradeoffs and shortcomings for wildlife.

Ecosystem Approach

The ecosystem approach to environmental planning played a significant role in the planning of the Mount Pleasant NHS and in my analysis. Key ideas from the ecosystem approach such as acknowledging the interconnectedness between humans, non-human organisms, and the abiotic environment, are clearly reflected in the natural heritage policy and the built landscape.

The ecosystem approach, defined by the Convention on Biological Diversity (CBD) is "a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way" (Convention on Biological Diversity, 2010). The ecosystem approach acknowledges the interconnectedness between living organisms and their abiotic environment which includes humans and the built environment. Therefore, it recognizes that humans are an integral component of ecosystems (Convention on Biological Diversity, 2010; van Bohemen, 2012, p. 27).

The ecosystem approach recognizes that humans form part of the abiotic environment and "cannot escape from it; human existence is dependent on the biological life-support systems of the earth" (van Bohemen, 2012, p. 27). The relevance of an ecosystem approach to managing land has grown due to the fact that humans have continued to negatively impact the ecosystems on which they depend (van Bohemen, 2012, p. 27).

In 1992, the Royal Commission on the Future of Toronto's Waterfront introduced an "ecosystem approach" planning and development model (Laidley, 2007, p. 1; Royal Commission, 1992, p. 16–17). This approach promised to put environmental health and sustainability on the same level as the economy and livability (Laidley, 2007, p. 1, Royal Commission, 1992, p. 16–17). "The Commission's ecosystem approach focused on appreciating "links and relationships" and preserving "the integrity, quality, productivity, dignity, and well-being of the ecosystem. (Barrett, 1991, p. 37; Royal Commission, 1990, p. 17)," (Laidley, 2007, p.5). By understanding the interactions in ecosystems, this planning approach would result in better decision-making and solutions to environmental problems associated with development (Laidley, 2007, p. 1, Royal Commission, 1992, pp. 16–17).

Laidley (2007, p. 2) offers a great overview of the ecosystem approach:

"Founded on the notion that "everything is connected to everything else" (Royal Commission on the Future of the Toronto Waterfront, 1990, p. 17), the ecosystem approach recognised connections between human activity and the natural world and the various impacts of environmental health and degradation on economic and social activity. Only through a reconfiguration of waterfront planning and

development from within the intersection of environment, economy, and community, the ecosystem approach proclaimed, could the vision be found to "restore the health and usefulness of the waterfront" (Royal Commission on the Future of the Toronto Waterfront, 1990, p. 83)."

Through the lens of the ecosystem approach, then, cities should be seen as natural ecosystems within which environmental, economic, and community concerns are interrelated and mutually constitutive (Laidley, 2007, p.5–6). The ecosystem approach to land use planning should be implemented in order to create sustainable urban areas that put "the city in nature instead of nature in the city" (van Bueren, 2012, et al., p. 18).

The City of Brampton has an established and long-standing ecosystem approach to land use planning and development that "recognizes the dynamic interrelationship of all elements of the biophysical community that are necessary to achieve a sustainable, healthy ecosystem" and "which recognizes the environment on a level with social and economic concerns" as stated in the City's Official Plan (Brampton, 2006, p. 2-3, 3-3, 4.5-1). This "ecosystem approach works on multiple levels of system-based planning, from higher order Official Plan policies, to subwatershed studies, to site specific implementation policies and requirements are a component of this approach" (Brampton, 2006, p. 2-3). The Official Plan states that "To ensure that environmental planning decisions are made in accordance with an ecosystem approach, the results of Watershed Plans, including watershed strategies, and Subwatershed Studies will form the basis for development" (Brampton, 2006, p. 4.5-3). Since the ecosystem approach was a prevalent concept in Brampton's land use planning policies and process, it provided a major lens through which I assessed the landscape and determined policy-implementation gaps.

The assumption that Subwatershed Studies would form the basis for development and the assumption that this would ensure environmental planning decisions would be made in accordance with an ecosystem approach, were both wrong. The Secondary Plan was approved prior to the SWS even being completed. Additionally, the SWS did not contain a level of detail about many natural features that would have been sufficient to make a well-informed decision about their conservation.

Additionally, when it came to many decisions, the environment was not recognized on the same level as social and economic concerns. In many cases, economic or social considerations were chosen over the environment, which led to ecological tradeoffs:

The NHS itself was minimized, and many existing natural features were removed in order to maximize developable area for single-detached housing (Malone, 2011, p. 133, 134, 139). This would maximize landowners' profits, and the lower density housing generates significantly more tax revenue

to support City services per capita, while having less NHS area means less maintenance costs for the City (Malone, 2011, p. 133, 134, 139).

Additionally, Sandalwood Parkway was realigned over Wetland 9 (Map 3 (Wetland 9); Figures 66, 67), a Provincially Significant Wetland (PSW) Candidate chosen to be protected (Stonybrook, 2011a, p. 2-72), in order to save an existing lacrosse field (Map 3 (Retained Lacrosse Field); Figure 98) (accommodating the field elsewhere would have been "costly"), create a "better intersection configuration" and "balance property interests" (by ensuring the road straddle the property line of both owners to the north and south so that the owner to the south would not have the road completely on their property which would have decreased the landowner's developable area and profits) (Stonybrook, 2011a, p. 10-4 – 10-9; Stonybrook, 2011b, p. 31–32).

The CNR culvert was altered in order to mitigate the existing impediment to upstream fish migration created by the existing CNR culvert (AMEC, 2010a, p. 387, Stonybrook, 2011a, p. 10-12–10-14), as recommended by the SWS and EIR, and while a design that improved connectivity compared to the existing culvert was implemented (Figure 71), it still creates a greater barrier to fish movement in comparison to the more costly EIR designs (Stonybrook, 2011a, p. 10-13– 10-14) , neither of which were implemented.

Finally, trails in the NHS, which although allow for great social benefits, also greatly fragment the NHS (Figures 75–77), for instance one trail cuts through and fragments the northernmost Mayfield Woodland (Figure 75), and allow for people to dump garbage into the NHS (Figure 78).

While many of the key ideas from the ecosystem approach are clearly being applied to planning new suburban environments, and are reflected in natural heritage policy, these ideas do not always translate to on-the-ground outcomes. While scholarship on the ecosystem approach recognizes the environment on the same level as social and economic concerns, and policies mimic this sentiment, this study demonstrates that decisions are still made to favour economic and social benefits that result in ecological tradeoffs.

Additionally, the intent of the ecosystem approach is being skewed by the façade that because environmental studies were done means that environmental planning followed the ecosystem approach. This study demonstrates that environmental studies do not ensure that environmental planning decisions would be made in accordance with an ecosystem approach, and they do not even form the basis for development.

Throughout my graduate planning studies, I was exposed to many of the ideas from landscape ecology, ecodesign, green infrastructure, and the ecosystem approach. This scholarship is very useful as

an introduction to environmental planning and as a guideline for designing communities with the natural environment, rather than against it. Ecodesign has the most promise, in my opinion, as an environmental planning approach for future development, since it focuses on inventorying the existing natural features and preserving them as part of the new community, rather than clearing or regrading natural landscapes to meet some preconceived, profit-maximizing development plan. This study, however, demonstrates what happens when natural features are inventoried as a way to "brand" the development as ecologically sound, but the inventories are not used as a basis for development.

As a result of my research, I believe that we have a good understanding of how to approach environmental planning but not enough in the way of dealing with the realities and priorities (agenda-setting) of the process, politics, and land economics.

Chapter 4: Findings: Policy vs Implementation Analysis

In this chapter, I unpack the policy framework from the Brampton Official Plan and the Mount Pleasant Secondary Plan. In doing so, I demonstrate the policy-implementation gap that I found as a result of my research. The major studies that are required for development, as outlined in the Official Plan policies, are the major problems in creating this gap—the subwatershed studies are intended to be comprehensive, foundational, and integrated, and the EIR is supposed to set out the responsibilities of the developer in shaping the landscape in keeping with the findings of the subwatershed study. Given that these environmental studies were incomprehensive, and that plans were created and approved prior to the completion of these studies, I demonstrate that a large gap exists between the natural heritage policies and the on-the-ground outcomes.

The policies guiding the development of the Mount Pleasant community are in the Brampton Official Plan and the Mount Pleasant Secondary Plan. In this section, I provide a detailed review of how Official Plan and Secondary Plan policies were implemented in the Mount Pleasant natural heritage system. I reviewed the 2006 Official Plan (in effect during the Mount Pleasant planning process) to determine the relevant policy sections for my policy-implementation gap analysis. Given that the purpose of my paper is to analyze the policy-implementation gap for natural heritage policies, I chose to analyze the policies in Section 4.5 "Natural Heritage and Environmental Management". These policies outline how development should proceed in regard to natural heritage and environmental management. Given that the policies in Section 4.14 "North West Brampton Urban Development Area" outline how development in regard to environmental planning should proceed for Mount Pleasant,

including the stages of planning approvals that must be realized, I also chose to analyze this section.

I also reviewed the Mount Pleasant Secondary Plan to determine the relevant policy sections for my policy-implementation gap analysis. I chose Natural Heritage System, Road, and Community Block Plan policies, all of which outline how development should proceed regarding the natural heritage system.

I first outlined the policies, then I identified the policy implementation gaps by comparing and contrasting the policies to the implementation of the NHS. In this way, I was also able to determine why these shortcomings came to be. For each of these policy sections, I analyzed the intent of the policies and the assumptions made by these policies. I contrasted the policy intentions and assumptions with my constructed timeline of how the planning process unfolded (Appendix 1), the shortcomings of environmental studies, the decision points that led to ecological tradeoffs, and with the existing post-development NHS (as determined through my field and orthophoto assessments).

Brampton Official Plan (2006)

4.5 NATURAL HERITAGE AND ENVIRONMENTAL MANAGEMENT

4.5.1 Watershed Plans and Subwatershed Studies
These policies outline the requirements of the Subwatershed Studies to be submitted by developers. An approved Subwatershed Study is a prerequisite before the approval of a Secondary Plan. This study includes the identification of natural features necessary for the ecological and hydrological integrity of the watershed. It includes an assessment of the impacts of development. It also includes recommendations for the protection, restoration and enhancement of natural features, functions and linkages, and long-term monitoring requirements. Development should generally conform with these recommendations

Discussion of the Policy-Implementation Gap:

These policies give the impression that the approved subwatershed study will provide decision-makers with detailed information about the existing natural features and how to proceed with protecting and restoring them in the future landscape. Thus, these policies also give the impression that the approved Subwatershed Study will be completed before detailed plans for the landscape are devised. However, this was not done. The Subwatershed Study was not completed prior to the approval of the Secondary Plan (Appendix 1) and the following outstanding issues remained: details about the natural features were missed, the natural features to be protected were not clearly identified, the

impacts on natural features were overlooked, targets were ignored, and long-term monitoring is up in the air.

The Subwatershed Study did not give a level of detail about most existing natural features that would have been sufficient to make informed decisions about their conservation. While creek reaches were individually listed out and described, no other existing natural features (woodlands, forest, wetlands, meadows, grasslands, abandoned pasture, hayfields, thickets, individual trees, etc.) were. Instead, broad land areas were discussed, rather than the individual features. Given that only 6% of the subwatershed area was natural cover (Stonybrook, 2011a, p. 2-1), this would have been an easy task. To put this into perspective, even basic details about each wetland such as wetland type, water level fluctuations, and wildlife functions, were not explicitly stated until the EIR.

In terms of the identification of the natural features to be conserved or impacted, only the fate of some of the creek reaches was explicitly stated (AMEC, 2010b, p. 68). The SWS did not state which other natural features would be conserved or impacted. For instance, the fact that 5 wetlands would be removed (Stonybrook, 2011a, p. 2-72) was not explicitly stated, which creek reaches would be removed was unclear (AMEC, 2010b, p. 68), the removal of the CNR Woodland, Hawthorn thicket, and hundreds of trees outside of the NHS was not mentioned (Stonybrook, 2011a, p. 7-1,7-2; Kuntz, 2011, p. 8), the removal of a portion of the Regenerating Meadow was not mentioned, and the removal of the Bobolink meadow habitat (Stonybrook, 2011a, p. 2-75, 13-25) was also not mentioned.

Not all of the recommendations of the Subwatershed Study were met. For instance, consensus was not achieved for forest and wetland cover targets and targets for contaminants of concern from stormwater runoff (AMEC, 2010b, p. 12, 13, 18, 19). Additionally, the SWS recommended terrestrial benches in culverts for species movement (AMEC, 2010b, p. 61–62), but these were not implemented in the Sandalwood Parkway, Veterans Drive, or CNR culverts (Figures 24, 29, 71). Additionally, the SWS recommended mitigating the existing impediment to upstream fish migration created by the existing CNR culvert (AMEC, 2010a, p. 387), and while a design that improved connectivity compared to the existing culvert was implemented (Figure 71), it still creates a greater barrier to fish movement in comparison to the EIR designs (Stonybrook, 2011a, p. 10-13– 10-14), neither of which were implemented. Additionally, the SWS recommended and provided guidance for the creation of a well-defined, continuous watercourse corridor that would connect the previously fragmented watercourse to provide better connectivity and migration opportunities for fish and other aquatic species between the northern and southern portions of the creek (Stonybrook, 2011a, 2-36, 3-1, 3-2, 4-1, 5-4, 5-19; AMEC, 2010a, p. 260, 308, 377–381, 390). This was the justification behind the creek lowering and realignment.

However, my field visits determined that while the southern portions of the creek are very continuous due to the water input provided by the stormwater management ponds (Figures 20–32), the northern portions of the creek still remain fragmented (Figures 33–55). Additionally, the SWS (and the associated LSA) recommended the NHS have connectivity with the broader region (AMEC, 2010a, p. 318–320, 401–403), however, the north-south linear nature of the NHS (Map 3) does not provide much east-west connectivity to the broader region. While CVC originally conceptualized an east-west linkage area across the northern portion of the Secondary Plan area, this was deemed as "impractical", "would conflict with other important objectives", "would not be effective due to fragmentation by roads" and "existing east-west linkage is already created by the Etobicoke Creek valleylands north of the Mount Pleasant Community in the Town of Caledon" (AMEC, 2010a, p. 403). In this way, an east-west linkage was not encouraged or supported. Mayfield Road at the northern boundary of the NHS (Map 3; Figure 96), and the CN railway (Map 3; Figure 71) and Bovaird Dr. (Map 3) at the southern boundary of the NHS, also create a barrier to connectivity north and south of the NHS.

Phase 4 of the Subwatershed Study was to be the Long-Term Monitoring Plan to fulfill the long-term monitoring requirements (AMEC, 2010b, p. 3, 5), however, the Phase 3 Report explains that "Phase 4 will not be conducted as part of this study, however, further details will be offered by the development proponents, in consultation with the City of Brampton and Credit Valley Conservation" (AMEC, 2010b, p. 3). It is unclear whether this long-term monitoring is even occurring.

4.5.2 Environmental Implementation Reports

These policies outline the requirements of the EIR to be submitted by developers. An approved EIR is a prerequisite before the approval of a community block plan. The EIR must include inventories and analysis of the natural heritage features, functions and linkages. The EIR is required to address the impacts of development on the natural environment and to implement the recommendations of subwatershed studies. The EIR is evaluated based upon the perceived risk of compromising the integrity of the natural heritage features, functions and linkages if the proposed development is approved and, despite the application of mitigation measures.

Discussion of the Policy- Implementation Gap:

The intent of these policies is to identify the impacts of the development and provide opportunities for mitigation of these impacts. Thus, these policies give the impression that the approved EIR will be completed before the block plan is approved. However, the EIR was not completed prior to the approval of the block plan (Appendix 1) and there were few opportunities for the EIR to mitigate the impacts of the development on natural features: mitigation targets and recommendations were not

implemented, and many natural features were already planned to be destroyed prior to the EIR, there was no way to mitigate these impacts.

The EIR did not implement all of the recommendations of the Subwatershed Study. For instance, consensus was not achieved for forest and wetland cover targets and targets for contaminants of concern from stormwater runoff (AMEC, 2010b, p. 12, 13, 18, 19; Stonybrook, 2011a, p. 13-17, 13-23, 13-24). Additionally, the SWS recommended terrestrial benches in culverts for species movement (AMEC, 2010b, p. 61–62), and while the EIR had typical designs for these terrestrial benches (Stonybrook, 2011a, p. 10-9–10-11), these were not implemented in the Sandalwood Parkway, Veterans Drive, or CNR culverts (Figures 24, 29, 71). Additionally, the SWS recommended mitigating the existing impediment to upstream fish migration created by the existing CNR culvert (AMEC, 2010a, p. 387). While the EIR did have two improved culvert designs (Stonybrook, 2011a, p. 10-13–10-14), neither were even implemented, instead a design was implemented that still creates a greater barrier to fish movement in comparison to the EIR designs (Figure 71).

While the EIR is evaluated "based upon the perceived risk of compromising the integrity of the natural heritage features, functions and linkages if the proposed development is approved, and despite the application of mitigation measures", the natural features chosen to be removed already occurred during the secondary planning process, and with the approval of the Secondary Plan, when many natural features were left out of the NHS. While the EIR contained great detailed information about the natural features, including those to be removed, including the 5 wetlands (Stonybrook, 2011a, p. 2-72), the CNR Woodland, the Hawthorn thicket, portion of the Regenerating Meadow (Stonybrook, 2011a, p. 7-1,7-2; Kuntz, 2011, p. 8), the Bobolink meadow habitat (Stonybrook, 2011a, p. 2-75, 13-25), and the 490 trees outside of the NHS (Stonybrook, 2011a, p. 7-1, 7-2; Kuntz, 2011, p. 8), it was too late to save these features or mitigate impacts against them by the EIR stage. This detailed inventory and analysis should have been done as the first stage of the planning process, in order to provide the level of detail about the existing natural features that would have been sufficient to make informed decisions about their conservation or mitigate impacts against them (this is described in Chapter 5).

4.5.3 Storm Water Management

These policies outline the requirements regarding Storm Water Management in developments.

• A storm water management plan will implement management concepts endorsed by a subwatershed or other environmental study (EIR).

• The City shall ensure that storm sewers are designed to utilize natural drainage features, where appropriate. Drainage diversions may only be considered if assessed and found to be acceptable in subwatershed and environmental studies, and supported by area Conservation Authorities.

• The City will promote consideration of the current standards of the relevant Conservation Authority to address the quality of storm water run-off released to any natural heritage feature, including a valley corridor or watercourse.

• The City shall consult and co-operate with the Conservation Authority as necessary in determining the required measures to implement an environmentally conscious storm water management network.

Discussion of the Policy-Implementation Gap:

These policies give the impression that the current Conservation Authority standards to address the quality of stormwater run-off released to natural features would be agreed upon during the SWS and subsequently implemented into the development. However, consensus was not achieved among stakeholders on stormwater quality targets (AMEC, 2010b, p. 12, 13), and this standard was not achieved.

Ontario Ministry of the Environment (MOE) Level 1 Enhanced was used as the minimum standard for contaminants loadings (AMEC, 2010b, p. 12, 13). Whereas CVC advocates working towards "zero" net loading (i.e. no net increase in annual contaminant loading post-development) (AMEC, 2010b, p. 12, 13, 32). The Subwatershed Study reveals that there would still be an increase in annual loadings for some of the Contaminants of Concern for post-development land use conditions compared to the existing land use (AMEC, 2010b, p.32). The current Conservation Authority standards for stormwater runoff were not followed, and contaminants of concern are subsequently being released into the natural heritage features.

These policies also give the impression that storm sewers are designed to utilize natural drainage features and that drainage diversions would be rarely considered and only if first assessed by subwatershed and environmental studies and if supported by the Conservation Authority. However, this is far from the truth. For Mount Pleasant, the decision to realign the creek to accommodate the post-development stormwater runoff was made prior to the completion of the Subwatershed Study and additional environmental studies (with the initial Landowners Plan (2007) and the City's POD Plan (2009) which already demonstrated the creek realignment), whereas the initial Conservation Authority (CVC)

land use plan was based on maintaining many natural features in their current state with no or minimal adjustments to watercourse alignment (Malone, 2011, p. 121–124). Thus, the Conservation Authority did not initially support this realignment. The realignment of the creek to support post-development stormwater runoff ultimately resulted in the loss of many creek reaches (AMEC, 2010b, p. 68) and 5 wetlands (Stonybrook, 2011a, p. 2-72), left some former creek reaches unprotected as open watercourses outside of the NHS (AMEC, 2010a, p. 351, 375; AMEC, 2010b, p. 68) (Map 3 (Open Channels from Pre-existing Huttonville Creek); Figures 99–102) and turned the creek into an above-ground storm sewer with an engineered natural aesthetic.

4.5.6 Natural Heritage System These policies outline how the natural heritage system is created during the process of planning a development.

4.5.6.2 Natural heritage features are evaluated and identified through a watershed plan, subwatershed studies, Environmental Implementation Reports and natural heritage system studies.

Discussion of the Policy-Implementation Gap:

This policy gives the impression that natural heritage features will be sufficiently evaluated and identified through the SWS and other studies. Through the analysis of 4.5.1 above, it is shown that this is not done. This policy also gives the impression that if natural features are evaluated and identified, they will be protected. Through the analysis of 4.5.1 and 4.5.2 above, it is shown that this is not done.

4.5.6.4 The natural heritage system is created in consultation and in cooperation with the Conservation Authorities, the Ministry of Natural Resources, and other agencies.

Discussion of the Policy-Implementation Gap:

This policy gives the impression that the natural heritage system is collaboratively created by all stakeholders, including CVC and MNR, but this is not the case, which leads to ecological tradeoffs.

Competing Natural Heritage Systems existed at the beginning of the planning process (Malone, 2011, p. 121–124, 133–134, 138–139). The Landowners' Plan had a NHS that was 13% of the total land area (which was mimicked by the City's POD Plan that had a NHS of 16% of the total land area) both of which contained the current NHS alignment, with the creek realigned through the center of the Secondary Planning Area to maximize developable area (Malone, 2011, p. 121–124, 133–134, 138–139).

In contrast, the CVC/MNR Plan NHS maintained many natural features in their current state with no or minimal adjustments to watercourse alignment, and had a NHS that was 30% of the total land area (Malone, 2011, p. 121–124, 133–134, 138–139).

The City's POD plan moved forward in the planning process which meant a smaller NHS and the resulting ecological tradeoffs, as well as more tensions and competition between actors regarding planning the NHS later on, since the values of MNR and CVC were not reflected in the land use plan from the get-go. For instance, there were tensions and competition between actors concerning the removal of the racetrack pond (Wetland 12) (Stonybrook, 2011b, p. 6–7), the realignment of Sandalwood Parkway into Wetland 9, a PSW Candidate chosen to be protected (Stonybrook, 2011a, p. 2-72; Stonybrook, 2011b, p. 6, 27, 31–32, 44–45) and any proposed changes to the NHS boundaries (Stonybrook, 2011b, p. 6, 28).

4.5.6.5 In accordance with the Provincial Policy Statement, development shall not be permitted in significant habitat of endangered species and threatened species or in Provincially Significant Wetlands.

Discussion of the Policy-Implementation Gap:

This policy gives the impression that development will not occur in significant habitat of endangered species and threatened species or in Provincially Significant Wetlands. However, in Mount Pleasant, development occurred in all three. Development occurred in the regulated habitat of the endangered Redside Dace (Stonybrook, 2011a, p. 12-7–12-8), in the habitat of the Threatened Bobolink (Stonybrook, 2011a, p. 2-75, 13-25), and in Wetland 9 (Stonybrook, 2011a, p. 3-10), a PSW Candidate chosen to be protected (Stonybrook, 2011a, p. 2-72).

Despite the Redside Dace being an endangered species (uplisted in 2009) as identified in the provincial Endangered Species Act, 2007, and Species at Risk and their habitats are afforded protection under the Endangered Species Act and Ontario Regulation 242/08, the contributing regulated habitat of endangered Redside Dace in the Mount Pleasant area was altered, damaged and destroyed since the development received an exemption from Sections 9(1) and 10(1) of the Endangered Species Act (Stonybrook, 2011a, p. 12-7–12-8).

In September 2010, Bobolink was listed as Threatened on the Endangered Species Act (2007) (Stonybrook, 2011a, p. 2-62). The SWS inventoried bobolink in both Terrestrial Unit P (Wetland 9) and a cultural meadow located west of Wetland 9 and just east of Mississauga Road (Stonybrook, 2011a, p. 2-62). The MNR and Savanta Inc. confirmed that there is no Bobolink habitat present in Wetland 9, but, the cultural meadow area, south of the racetrack pond (Wetland 12), was identified as potential suitable

habitat (Stonybrook, 2011a, p. 2-75). Savanta Inc. completed requested Bobolink surveys and submitted results to the MNR (Stonybrook, 2011a, p. 2-75). As of the time of submittal of the Final EIR, landowners and the MNR were still in discussions to determine the next steps with respect to meeting the requirements under Ontario's Endangered Species Act (2007) and in the ESA permit process with the MNR for these lands (Stonybrook, 2011a, p. 2-75, 13-11). However, based on my field visits and orthophotos, this cultural meadow area south of the racetrack pond was removed and is now development.

During the EIR and Block planning phase, Sandalwood Parkway was realigned north into Wetland 9 (Stonybrook, 2011a, p. 3-10) (Map 3 (Wetland 9); Figures 66, 67), a PSW Candidate chosen to be protected (Stonybrook, 2011a, p. 2-72). The road was moved in order to save an existing lacrosse field (Map 3 (Retained Lacrosse Field); Figure 98), create a "better intersection configuration" and "balance property interests" (by ensuring the road straddle the property line of both owners to the north and south so that the owner to the south would not have the road completely on their property which would have decreased the landowner's developable area and profits) (Stonybrook, 2011a, p. 10-4 – 10-9; Stonybrook, 2011b, p. 31–32). The fact that a road was realigned into the future PSW, proves that natural heritage policy is ignored and not met when it comes to upholding property interests.

This policy also gives the impression that PSWs are determined prior to the creation of the NHS so that they are protected from the impending development. However, Provincially Significant Wetlands were determined by MNR after the NHS was already finalized. In fact, it was understood that the PSWs would be chosen "after the completion of the planning process; with the size and configuration of PSW units matching those conserved within the final NHS" (Stonybrook, 2011a, p. 2-72) and this was agreed upon and written into the Mount Pleasant Secondary Plan Appendix F as part of the "Implementation Principles for the Mount Pleasant Subwatershed Study" (Brampton, 2009b). In this way, significant wetlands were not chosen first to be conserved and then the NHS built to accommodate them, but a NHS to maximize developable area was chosen first (Malone, 2011, p. 133, 134, 139), and any wetlands outside of this NHS would be removed, regardless of their ecological value. As a result, 5 PSW Candidates were destroyed (Stonybrook, 2011a, p. 2-72).

4.5.6.9 Restoration Areas will be added to the natural heritage system over time in accordance with the guidance provided in watershed plans, subwatershed studies, and natural heritage system studies.

Discussion of the Policy- Implementation Gap:

This policy gives the impression that restoration will actually take place once restoration areas are added to the NHS and when this restoration is guided by natural heritage system studies. While a newly created wetland was built south of Sandalwood Parkway (Map 3 (Created Sandalwood Wetland); Figures 91, 92, 97) to "replicate" the functions of removed wetlands, restoration never took place in the other major area, the "Tooth" (Map 3 (Tooth)), added to the NHS for wetland restoration, despite guidance being provided in environmental studies such as the SWS and EIR (Stonybrook, 2011a, p. 3-10, 5-17, 5-18, 5-19, 13-24; AMEC, 2010a, p. 396–397; AMEC, 2010b, p. 63), since a party responsible for the restoration was never determined early in the planning process.

During this planning process, wetland restoration of the "Tooth" area to compensate for removed wetland area was greatly emphasized as justification for removing wetland areas and as a way of meeting wetland cover targets (Stonybrook, 2011a, p. 3-10, 5-17, 5-18, 5-19, 13-24; AMEC, 2010a, p. 396–397; AMEC, 2010b, p. 63). However, the Mount Pleasant Secondary Plan Appendix F: Implementation Principles for the Mount Pleasant Subwatershed Study states that "planting or restoration in this area will not be completed by the City or the MPLG, but may be made by others and/or allowed to occur naturally" (Brampton, 2009b). No party was confirmed to be responsible for undertaking this restoration effort, meanwhile the environmental studies (such as the EIR and SWS) all discuss how this restoration will be the solution to the lost wetland area. Through my field visits, I discovered that this area remains as a Regenerating Meadow, not a wetland (Figures 79–85). The educational signage at the site even refers to the "tooth" as a wetland area (Figures 86–89), however, it is clearly a Regenerating Meadow with just a ditch to the east of it between it and the Park Woodland C. By not confirming the responsibility of the restoration to any party, the restoration never happened, despite the fact that the "tooth" was added to the NHS and environmental studies provided guidance on their implementation.

4.5.6.14 The City shall strive to achieve no net loss and if possible, a net gain, in natural heritage features and areas. In some instances where studies demonstrate that development and site alteration will have no negative impact on a natural heritage feature and/or area, the compensation for the feature and/or area that is no longer retained as part of the natural heritage system may be requested and subject to approval, compensation may be provided at another appropriate location to maximize the benefits to the natural heritage system.

Discussion of the Policy-Implementation Gap:

This policy gives the impression that environmental studies, such as the SWS impact assessment, will sufficiently demonstrate that the development will have no negative impact on the natural heritage

feature/area to be removed, and that the compensation provided at another appropriate location will actually be implemented. The analyses provided in 4.5.1 and 4.5.6.9 prove this was not done for the former or the latter.

Additionally, this policy assumes that an already established natural heritage feature, which provides ecological functions and habitat, can simply be engineered in another location, as long as there is no net loss in natural area, which goes against the tenets of ecodesign.

4.5.6.15 Removal of natural heritage features and areas from the City's natural heritage system shall be avoided and must be justified by an Environmental Impact Report or Environmental Impact Study in consultation with the Conservation Authorities and other relevant agencies. These studies will demonstrate to the satisfaction of the City in consultation with the Conservation Authorities that there will be no net loss, and if possible a net gain, in natural heritage system values and ecological functions.

Discussion of the Policy-Implementation Gap:

This policy gives the impression that the removal of natural heritage features (shown in the Official Plan Schedule D Natural Features and Areas (Brampton, 2006)) will actually be avoided and any removals will be justified by an EIR. However, the removal of 5 wetlands (Stonybrook, 2011a, p. 2-72), numerous creek reaches (AMEC, 2010b, p. 68), the CNR Woodland, the Hawthorn thicket, portion of the Regenerating Meadow (Stonybrook, 2011a, p. 7-1, 7-2; Kuntz, 2011, p. 8), the Bobolink meadow habitat (Stonybrook, 2011a, p. 2-75, 13-25), and 490 trees outside of the NHS (Stonybrook, 2011a, p. 7-1, 7-2; Kuntz, 2011, p. 8), indicates that removing natural features was not avoided. Additionally, these removals were never justified by the environmental studies.

The fact that there was a net gain in natural areas in the Mount Pleasant Secondary Plan Area should not justify the removal of already established natural heritage features, which provide ecological functions and habitat. Removing already existing natural features, goes against the tenets of ecodesign.

4.5.6.22 The City will consider the following planning principles to ensure protection and enhancement of natural heritage in the design of all development:

(i) Maintenance of the landforms and physical features of the site in their natural state to the greatest extent practicable, ensuring that the natural rather than man-made character of the site predominates;

(ii) Protection, enhancement and restoration of any stream, pond, marsh, valleyland and woodland habitat for both fish and wildlife;

(iii) Maintenance, enhancement and restoration of the features and functions of watercourses and drainage features consistent with natural geomorphic, hydrologic and fish habitat processes;

(iv) Protection of the quantity and quality of groundwater and surface waters and their quality from contamination by domestic effluent and by activities associated with the development;

(v) Protection, maintenance and restoration of remaining trees and woodlots

Discussion of the Policy-Implementation Gap:

(i) The physical features of the site were not maintained in their natural state, the entire creek was realigned through the center of the Mount Pleasant area to form the "spine" of a linear, engineered NHS (Stonybrook, 2011a, p. 4-1) to allow for the maximization of developable area (Malone, 2011, p. 133, 134, 139). The NHS itself is man-made, even though it has a "natural" aesthetic.

(ii) 5 wetlands (Stonybrook, 2011a, p. 2-72), numerous creek reaches (AMEC, 2010b, p. 68), the CNR Woodland, the Hawthorn thicket, portion of the Regenerating Meadow (Stonybrook, 2011a, p. 7-1,7-2; Kuntz, 2011, p. 8), the Bobolink meadow habitat (Stonybrook, 2011a, p 2-75, 13-25), and 490 trees outside of the NHS were all removed (Stonybrook, 2011a, p. 7-1,7-2; Kuntz, 2011, p. 8), not protected or enhanced.

(iii) As described in the 4.5.3 analysis, the existing watercourse was not maintained or enhanced, instead it was completely realigned to fulfill post-development drainage functions

(iv) As described in the 4.5.3 analysis, contaminants of concern from post-development stormwater runoff in natural features remains a water quality issue

(v) The CNR Woodland, the Hawthorn thicket, and 490 trees outside of the NHS were all removed (Stonybrook, 2011a, p. 7-1, 7-2; Kuntz, 2011, p. 8). Out of the 491 trees outside of the NHS, only 1 was chosen to be protected (Map 3 (Tree 318); Figures 56, 57) (Stonybrook, 2011a, p. 7-1,7-2; Kuntz, 2011, p. 8).

4.5.7 Valleylands and Watercourse Corridors

These policies outline how development will proceed in Lands designated as Valleylands/Watercourses Corridors on Schedule "D" of the Official Plan.

Although development is generally prohibited within a valleyland or watercourse corridor, when considering a development application various aspect shall be taken into account including:

- Opportunities to mitigate, enhance or restore natural features, functions and linkages, as defined in watershed, subwatershed or environmental studies

- The proposed measures to mitigate current and/or past impacts must be undertaken in an environmentally sound manner consistent with accepted environmental management practices

- The impact of the development proposal on both the biotic and abiotic systems of the valleyland and watercourse habitats;

-The costs and benefits in ecological, monetary, social and biological terms of any engineering works or environmental management practices needed to mitigate these impacts;

-The comments and approval of the appropriate Conservation Authority

Additionally, in order to maintain the linkage functions of valleylands, structures crossing a valley and/or watercourse shall provide for a suitable open span to accommodate the natural movement and functions of the feature as well as through movements of wildlife as appropriate.

In cases where further approved studies, conducted in consultation with the Conservation Authorities and relevant agencies, have evaluated a valleyland and/or watercourse feature, to be not significant to the natural heritage system, the water course feature may revert to the relevant adjacent land use designation(s) without the need for an amendment to this Plan.

Discussion of the Policy-Implementation Gap:

These policies give the impression that the decision to alter a watercourse corridor will occur after the natural features, development impacts, and ecological costs have been sufficiently evaluated through environmental studies. Through the analysis of 4.5.1 above, it is shown that this is not done. The decision to realign the creek, which altered and removed numerous reaches (AMEC, 2010b, p. 68), left some former creek reaches unprotected as open watercourses outside of the NHS (AMEC, 2010a, p. 351, 375; AMEC, 2010b, p. 68) (Map 3 (Open Channels from Pre-existing Huttonville Creek); Figures 99–102) and removed 5 wetlands (Stonybrook, 2011a, p. 2-72) connected to the watercourse corridor, occurred prior to completion of these studies. Ultimately, the decision to realign the creek was done in order to maximize developable area (Malone, 2011, p. 133, 134, 139), which was decided on from the beginning of the planning process with the City's POD plan. While this decision to realign the watercourse was apparently justified by the fact that it could create a well-defined, continuous

watercourse corridor that would connect the previously fragmented watercourse to provide better connectivity and migration opportunities for fish and other aquatic species between the northern and southern portions of the creek (Stonybrook, 2011a, 2-36, 3-1, 3-2, 4-1, 5-4, 5-19; AMEC, 2010a, p. 260, 308, 377–381, 390) my field visits determined that while the southern portions of the creek are very continuous due to the water input provided by the stormwater management ponds (Figures 20–32), the northern portions of the creek still remain fragmented (Figures 33–55).

These policies also give the impression that environmental studies will sufficiently define the opportunities to mitigate, enhance and restore natural features impacted by the alteration of a watercourse corridor. Through the analysis of 4.5.1 and 4.5.2 above, it is shown that this is not done.

These policies also give the impression that water corridor alteration will be planned cooperatively with the Conservation Authority. This was not done, as demonstrated in the analysis of 4.5.6.4.

These policies also suggest that known fragmentation mitigation efforts to aid in ecological connectivity such as road and rail culverts that support species movement will be assessed from the start of the land use planning process and be implemented into the development. However, these known mitigation strategies were not considered at the beginning of the planning process, but rather, during the EIR phase, and their implementation fell short, as described in the analysis of 4.5.2.

4.5.8 Woodlands and The Urban Forest

These policies outline how development will proceed in Lands designated as Woodlands on Schedule “D” of the Official Plan.

Prior to development, Watershed Plans, Subwatershed Studies, Environmental Implementation Reports, natural heritage system studies or vegetative assessments will be required to evaluate and make recommendations for the protection of woodlands and how they can be maintained, restored and/or enhanced through sensitive subdivision and site design. The proponent is required to ensure that the protection measures that are identified and deemed appropriate by the City are implemented.

Pursuant to By-Law 402-2005 (A By-law to conserve and protect woodlots from the impacts of development in all areas within the City of Brampton) and prior to removal of any trees in a woodland, the applicant must submit a silvicultural prescription to apply for a permit pursuant to the Municipal Act.

In addition to preserving existing vegetation where practicable, proponents of new developments will be required to re-forest their development areas through the planting of trees on boulevards, buffers and stormwater management ponds.

Discussion of the Policy-Implementation Gap:

These policies give the impression that the decision to alter woodlands will occur after the natural features, development impacts, and ecological costs have been sufficiently evaluated through environmental studies. Through the analysis of 4.5.1 above, it is shown that this is not done. The decision to remove the CNR woodland, the Hawthorn thicket, portion of the "tooth" Regenerating Meadow, and the removal of 490 individual trees outside of the NHS (Stonybrook, 2011a, p. 7-1, 7-2; Kuntz, 2011, p. 8) occurred prior to completion of these studies, again, to maximize developable area (Malone, 2011, p. 133, 134, 139).

These policies give the impression that all woodlands are protected by By-Law 402-2005. However, the Vegetation Conservation Plan field inventories (completed during the EIR phase) indicated that neither the CNR woodland or Hawthorn Thicket are considered woodlots under this by-law and are therefore exempt from protection and were subsequently destroyed (Kuntz, 2011, p. 5, 8). Additionally, the "Tooth" Regenerating Meadow is considered a woodlot under the bylaw, but a portion of it still received approval to be destroyed (Kuntz, 2011, p. 5).

The fact that out of the 491 individual trees outside of the woodlands, only 21 were considered for conservation, and then only 1 was conserved (Map 3 (Tree 318); Figures 56, 57), demonstrates that vegetation outside of the City's and Landowners' preferred minimized NHS was not even considered for preservation, all for the sake of maximizing developable area, and building convenience (Stonybrook, 2011a, p. 7-1,7-2, 2-45; Kuntz, 2011, p. 5, 6, 8; Malone, 2011, p. 133, 134, 139).

4.5.9 Wetlands

These policies outline how development will proceed in Lands designated as Provincially Significant Wetlands and other Wetlands on Schedule "D" of the Official Plan.

Development and site alteration are not permitted within Provincially Significant Wetlands in accordance with the Provincial Policy Statement.

Based on the recommendations of the Watershed Plans, Subwatershed Studies, Environmental studies and natural heritage system studies, the City will require that those wetlands that are recommended for protection be maintained, restored and/or enhanced. Furthermore, the City will encourage wetland creation to mitigate the loss of locally significant and unevaluated wetlands. The City shall not permit the fill, removal or loss of wetlands identified for protection by these studies.

Discussion of the Policy-Implementation Gap:

This policy gives the impression that PSWs are determined prior to the creation of the NHS so that they are protected from the impending development. However, Provincially Significant Wetlands were determined by MNR after the NHS was already finalized. In fact, it was understood that the PSWs

would be chosen “after the completion of the planning process; with the size and configuration of PSW units matching those conserved within the final NHS” (Stonybrook, 2011a, p. 2-72) and this was agreed upon and written into the Mount Pleasant Secondary Plan Appendix F as part of the “Implementation Principles for the Mount Pleasant Subwatershed Study” (Brampton, 2009b). In this way, significant wetlands were not chosen first to be conserved and then the NHS built to accommodate them, but a NHS to maximize developable area was chosen first (Malone, 2011, p. 133, 134, 139), and any wetlands outside of this NHS would be removed, regardless of their ecological value. As a result, 5 PSW Candidates were destroyed (Stonybrook, 2011a, p. 2-72).

This policy gives the impression that development will not occur in the Provincially Significant Wetland Candidates chosen to be conserved, however, a road was realigned into Wetland 9, which was a PSW Candidate chosen to be protected (Stonybrook, 2011a, p. 2-72). During the EIR and Block planning phase, Sandalwood Parkway was realigned north into Wetland 9 (Stonybrook, 2011a, p. 3-10) (Map 3 (Wetland 9); Figures 66, 67). The road was moved in order to save an existing lacrosse field (Map 3 (Retained Lacrosse Field); Figure 98), create a “better intersection configuration” and “balance property interests” (by ensuring the road straddle the property line of both owners to the north and south so that the owner to the south would not have the road completely on their property which would have decreased the landowner’s developable area and profits) (Stonybrook, 2011a, p. 10-4 – 10-9; Stonybrook, 2011b, p. 31–32). The fact that a road was realigned into the future PSW, proves that natural heritage policy is ignored and not met when it comes to upholding property interests.

These policies also give the impression that the decision to alter wetlands will occur after the natural features, development impacts, and ecological costs have been sufficiently evaluated through environmental studies. Through the analysis of 4.5.1 above, it is shown that this is not done.

These policies also assume that environmental studies will sufficiently define the opportunities to mitigate, enhance and restore wetlands impacted by the alteration of a watercourse corridor. Through the analysis of 4.5.1 and 4.5.2 above, it is shown that this is not done.

These policies also give the impression that when environmental studies identify wetland creation sites to mitigate the loss of wetlands, and add these sites to the NHS, that the wetland creation will actually occur. The 4.5.6.9 analysis demonstrates that without designating a responsible party for wetland creation, this mitigation may never occur.

Additionally, this policy assumes that already established wetlands, which provide ecological functions and habitat, can simply be engineered in another location, which goes against the tenets of ecodesign.

4.5.12 Fish and Wildlife Habitat

These policies outline how development will proceed in fish and wildlife habitat

Development and site alteration in significant habitat of vulnerable, threatened or endangered species is not permitted in accordance with the Provincial Policy Statement.

Development and site alteration within significant wildlife habitat is not permitted, unless it has been demonstrated through an environmental study that there will be no negative impacts on the natural features or their ecological functions on those areas.

Based on the recommendations of the Watershed Plans, Subwatershed Studies, Environmental studies and/or natural heritage system studies, the City will require that fish and wildlife populations and habitat recommended for protection be maintained, restored and/or enhanced

As part of a development application affecting fish and/or wildlife habitat, an Environmental Impact Report or Environmental Impact Study will be required, to determine any negative impacts on the feature and its ecological function and mitigation measures to address potential impacts on habitat.

Discussion of the Policy-Implementation Gap:

These policies assume that development will not occur in significant habitat of vulnerable, threatened or endangered species, however, development occurred in the regulated habitat of the endangered Redside Dace (Stonybrook, 2011a, 12-7 – 12-8) and in the habitat of the Threatened Bobolink (Stonybrook, 2011a, p. 2-75, 13-25).

Despite the Redside Dace being an endangered species (uplisted in 2009) as identified in the provincial Endangered Species Act, 2007, and Species at Risk and their habitats are afforded protection under the Endangered Species Act and Ontario Regulation 242/08, the contributing regulated habitat of endangered Redside Dace in the Mount Pleasant area was altered, damaged and destroyed since the development received an exemption from Sections 9(1) and 10(1) of the ESA (Stonybrook, 2011a, 12-7 – 12-8).

In 2010, Bobolink was listed as Threatened on the Endangered Species Act (2007) (Stonybrook, 2011a, p. 2-62). The SWS recorded bobolink in Terrestrial Unit P (Wetland 9), and a cultural meadow located west of Wetland 9 and just east of Mississauga Road (Stonybrook, 2011a, p. 2-62). The MNR and Savanta Inc. confirmed that there is no Bobolink habitat present in Wetland 9, but, the cultural meadow area, south of the racetrack pond (Wetland 12), was identified as potential suitable habitat (Stonybrook, 2011a, p. 2-75). Savanta Inc. completed requested Bobolink surveys and submitted results to the MNR (Stonybrook, 2011a, p. 2-75). As of the time of submittal of the Final EIR, landowners and the MNR were still in discussions to determine the next steps with respect to meeting the requirements under Ontario's Endangered Species Act (2007) and in the ESA permit process with the MNR for these lands

(Stonybrook, 2011a, p. 2-75, 13-11). However, based on my field visits and orthophotos, this cultural meadow area south of the racetrack pond was removed and is now development.

These policies also give the impression that the decision to alter wildlife habitat will occur after the natural features, development impacts, and ecological costs have been sufficiently evaluated through environmental studies. Through the analysis of 4.5.1 above, it is shown that this is not done. The decision to remove many habitat patches occurred prior to sufficient evaluation.

These policies also give the impression that environmental studies will sufficiently define the opportunities to mitigate, enhance and restore wildlife habitat impacted by the development. Through the analysis of 4.5.1 and 4.5.2 above, it is shown that this is not done.

These policies also make the assumption that the recommendations to improve fish and wildlife habitat will be achieved during implementation. Through the analysis of 4.5.1 and 4.5.2 above, it is shown that this is not done. For instance, the decision to realign the watercourse was apparently justified by the fact that it could create a well-defined, continuous watercourse corridor that would connect the previously fragmented watercourse to provide better connectivity and migration opportunities for fish and other aquatic species between the northern and southern portions of the creek (Stonybrook, 2011a, p. 2-36, 3-1, 3-2, 4-1, 5-4, 5-19; AMEC, 2010a, p. 260, 308, 377–381, 390), my field visits determined that while the southern portions of the creek are very continuous due to the water input provided by the stormwater management ponds (Figures 20–32), the northern portions of the creek still remain fragmented (Figures 33–55). Additionally, culverts across roads and the CN railway to allow for terrestrial and aquatic species movement were inadequately implemented as discussed in the analysis of 4.5.1 and 4.5.2 above.

4.5.13 Environmental Buffers, Setbacks and Linkages

These policies outline how the development process will establish conservation buffers and setbacks to protect natural heritage features, and well as linkages between natural heritage system areas.

For instance, a minimum 10 metre buffer to the limit of development will be required from natural features including woodlands and wetlands. A buffer in excess of 10 metres may be required based on the results of environmental studies that are prepared.

The City shall encourage the retention, enhancement and development of natural and man-made linkages between elements of the natural heritage system.

Discussion of the Policy-Implementation Gap:

These policies assume that the required buffer minimums for natural features will be implemented for all features. The environmental studies and Subwatershed Study Implementation Principles established that the buffer system for the NHS will be the greater of 10 m from the staked dripline of woodlands and/or 20 m from the staked limit of wetlands (AMEC, 2010a, p.400, 401; Stonybrook, 2011a, p. 2-70, 2-74; Brampton 2009b). These buffers were established and implemented for all woodlands and wetlands except for the south side of Wetland 9 as demonstrated in the Subwatershed Study Implementation Principles Schedule A (Stonybrook, 2011b, p. 33) and EIR Drawing 3.4.3A which illustrates all buffers to establish final NHS limits (Stonybrook, 2011a, p. 3-15, Stonybrook, 2011c). Instead, Sandalwood Parkway was aligned through the southern portion of the wetland (Stonybrook, 2011a, p. 3-10).

These policies also suggest that known fragmentation mitigation efforts to aid in ecological connectivity through linkages such as road and rail culverts that support species movement will be assessed from the start of the land use planning process and be implemented into the development. However, these known mitigation strategies were not considered at the beginning of the planning process, but rather, during the EIR phase, and their implementation fell short, as described in the analysis of 4.5.2.

Additionally, not all of the linkage recommendations of the SWS were met, as described in 4.5.1. The SWS recommended and provided guidance for the creation of a well-defined, continuous watercourse corridor that would connect the previously fragmented watercourse to provide better connectivity and migration opportunities for fish and other aquatic species between the northern and southern portions of the creek (Stonybrook, 2011a, 2-36, 3-1, 3-2, 4-1, 5-4, 5-19; AMEC, 2010a, p. 260, 308, 377–381, 390). This was the justification behind the creek lowering and realignment. However, my field visits determined that while the southern portions of the creek are very continuous due to the water input provided by the stormwater management ponds (Figures 20–32), the northern portions of the creek still remain fragmented (Figures 33–55). Additionally, the SWS (and the associated LSA) recommended the NHS have connectivity with the broader region (AMEC, 2010a, p. 318–320, 401–403), however, the north-south linear nature of the NHS does not provide much east-west connectivity to the broader region (Map 3). While CVC originally conceptualized an east-west linkage area across the northern portion of the Secondary Plan area, this was deemed as “impractical”, “would conflict with other important objectives”, “would not be effective due to fragmentation by roads” and “existing east-west linkage is already created by the Etobicoke Creek valleylands north of the Mount Pleasant Community in the Town of Caledon” (AMEC, 2010a, p. 403). In this way, an east-west linkage was not

encouraged or supported. Additionally, Mayfield Road at the northern boundary of the NHS (Map 3; Figure 96), and the CN railway (Map 3; Figure 71) and Bovaird Dr. (Map 3) at the southern boundary of the NHS, also create a barrier to connectivity north and south of the NHS.

4.14 NORTH WEST BRAMPTON URBAN DEVELOPMENT AREA

4.14.2 Prior to development occurring within the North West Brampton Urban Development Area, the following six stages of planning approvals must be realized:

(i) Stage 1 - There are three subwatershed studies required to be completed for North West Brampton. These are: Fletcher's Creek, Huttonville Creek and Main Credit River. Fletcher's Creek and Huttonville subwatershed studies cover the area referred to as the Mount Pleasant Secondary Plan Area (Area 51) or the Inverted "L". The Main Credit River subwatershed study and part of Huttonville subwatershed study are located west of the Inverted "L" and cover the balance of North West Brampton. A terrestrial landscape scale analysis of all three subwatersheds as well as full subwatershed studies for Fletchers and Huttonville creeks (that incorporate 5 years of Effectiveness Monitoring results) must be completed to the satisfaction of CVC and the City of Brampton before a natural heritage system can be defined. The Terms of Reference and resulting workplans for the subwatershed studies and the terrestrial landscape scale analysis must be completed to the satisfaction of CVC and the City of Brampton. The subwatershed studies may be commenced prior to the completion of five years of effectiveness monitoring, but subject to an approved terms of reference to the satisfaction of the City of Brampton and CVC. Subwatershed studies may be commenced but not completed until five years of effectiveness monitoring are incorporated.

(ii) Stage 2 - the establishment of general land use designations in the Official Plan once a Natural Heritage System for North West Brampton has been determined through approved subwatershed studies;

(iii) Stage 3 - the adoption of a secondary plan based on approved subwatershed studies;

(iv) Stage 4 - an Environmental Implementation Report completed for each block plan area to the satisfaction of the CVC and the City of Brampton;…

4.14.3 The environmental planning process for North West Brampton shall be undertaken in accordance with Section 4.14.2 and the flowchart "Timeline – Environmental and Planning Studies for North West Brampton" located at the end of this section. The flowchart can be modified through City Council approval to the satisfaction of Credit Valley Conservation, but without a formal amendment to this Plan.

4.14.5 When preparing secondary plans in North West Brampton, the following objectives are to be incorporated, where appropriate, as part of an implementing official plan amendment and shall be subject to the growth management and block planning policies of the Official Plan:… (ix) Protecting and preserving natural features; …

Discussion of the Policy-Implementation Gap:

These policies, approved when the North West Brampton Area was added to the urban expansion area of Brampton, set out a data collection, reviews, and approvals process for development in the North West Brampton Urban Development Area. This process, however, was not followed during the planning of Mount Pleasant.

For instance, the subwatershed studies were not completed prior to the approval of the Mount Pleasant Secondary Plan and its Land Use Plan (Appendix 1). Thus, the NHS and the Secondary Plan and Land Use Plan were not determined based on the results of the SWS.

Additionally, the environmental planning process for North West Brampton shown in the flowchart "Timeline – Environmental and Planning Studies for North West Brampton" (Brampton, 2006, p. 4.14-7) demonstrates that there is no real step-by-step, logical decision-making process when it comes to making decisions about the landscape. Environmental studies, impact assessments, class environmental assessments, the secondary planning process, and the block planning process all overlap. Processes being done and decisions being made in the wrong order, led to ecological tradeoffs.

Although these policies state that protecting and preserving natural features is an objective when preparing secondary plans in North West Brampton, the secondary planning process for Mount Pleasant demonstrated that natural features were not even properly identified or evaluated prior to the creation of a secondary plan that already determined Huttonville Creek would be drastically realigned, and 5 wetlands (Stonybrook, 2011a, p. 2-72), the CNR Woodland, the Hawthorn thicket, portion of the Regenerating Meadow (Stonybrook, 2011a, p. 7-1,7-2; Kuntz, 2011, p. 8), the Bobolink meadow habitat (Stonybrook, 2011a, p. 2-75, 13-25), and 490 trees outside of the NHS (Stonybrook, 2011a, p 7-1, 7-2; Kuntz, 2011, p. 8) would be destroyed.

Mount Pleasant Secondary Plan

5.4 NATURAL HERITAGE SYSTEM – BASIS OF SYSTEM

5.4.1 The boundaries of the Natural Heritage System Area designation shown on Schedule SP51 (a), and the provisions of this Chapter, reflect the initial findings of the North West Brampton Landscape Scale Analysis and Mount Pleasant Subwatershed Study, and reflect the principles outlined in the "Implementation Principles for the Subwatershed Study, November 24, 2009", attached as Appendix F to this Chapter. The boundaries of the final Natural Heritage System are to be confirmed through the Mount Pleasant Subwatershed Study and may be refined through the Environmental Implementation Reports (EIRs) consistent with the principles outlined in Appendix F including the Schedules and dimensions contained therein.

Discussion of the Policy-Implementation Gap:

Rather than providing a guide for the creation of the natural heritage system, these natural heritage secondary plan policies are the outcome of the negotiations between stakeholders that took

place during meetings leading up to and on November 24, 2009 (Appendix 1). The creation of the Implementation Principles (Brampton, 2009b) (the record of the results of the negotiations) on this date, just prior to the Secondary Plan Land Use Plan going forward to Council, ensured that stakeholders would have a written record of how the implementation of the Secondary Plan would proceed prior to the Secondary Plan approval. Despite the SWS being incomplete and the EIR still to come, which would help to mitigate ecological impacts, "principles" for how development would proceed were already determined.

5.5 NATURAL HERITAGE SYSTEM - GENERAL PROVISIONS

5.5.1 Minor refinements to the boundaries of the Natural Heritage System may be considered to reflect the differences in scale, and level of detail available through the preparation of the Environmental Implementation Reports (EIRs), and Functional Servicing Reports (FSRs). However, minor refinements shall not adversely impact the functions or result in any significant increase or decreases in size of the final Natural Heritage System

Discussion of the Policy-Implementation Gap:

Since minor refinements to the NHS boundaries may be considered, this allowed Sandalwood Parkway to be realigned further into Wetland 9 during the EIR phase (Stonybrook, 2011a, p. 3-10, 3-13). While this refinement of the NHS did not lead to significant changes to the size of the final NHS (Stonybrook, 2011a, p. 3-13), it allowed a portion of the wetland to be completely destroyed and the remaining wetland area to have a road running adjacent to it (Map 3 (Wetland 9); Figures 66, 67), with no buffer. In this way, this refinement adversely impacted the functions of the final NHS.

5.5.3 The final Natural Heritage System shall be zoned in a restrictive zoning designation to protect it from development and remain primarily in a natural state, or where possible, be restored and enhanced, in accordance with the recommendations of the Mount Pleasant Subwatershed Study and consistent with the principles outlined in Appendix F of this Chapter and attached schedules.

Discussion of the Policy-Implementation Gap:

Since the NHS outlined in the Secondary Plan was not the "final" NHS, not yet subject to restrictive zoning, this allowed for Sandalwood Parkway to be realigned further into Wetland 9 (Stonybrook, 2011a, p. 3-10, 3-13).

Additionally, further research of the NHS after planning was completed, revealed that despite restrictive zoning, the NHS may still be altered and natural features removed:

“On May 22, 2012 Trans-Canada Pipeline Limited (TCPL) received National Energy Board (NEB) conditional approval to twin their pipeline across the western portion of Brampton” (Brampton, 2012a, p. 3). “’On June 22, 2012 TCPL contacted City staff regarding permission to cut trees, per the City's Woodlot Conservation Bylaw 402-2005 ("Bylaw")” (Brampton, 2012a, p.3) to create a permanent easement for the new pipeline and temporary easement for construction purposes (Brampton, 2012a, p.3). Ultimately this pipeline twinning ended up removing 441 trees (0.69 hectares) from Park Woodland A (Map 3) (Brampton, 2012b, p. 27, 73), although new trees were planted back in the temporary work easements (Brampton, 2012b, p. 6). The presence of the pipeline through the NHS is explicitly stated through educational signage (Figures 93, 94) and warning signs (Figures 103, 104), and the alignment is shown on EIR Drawing 3.4.3A (Brampton, 2011c).

5.5.4 Permitted uses and activities within the Natural Heritage System shall be limited to fish, wildlife and conservation management; limited infrastructure including road and municipal services crossings, stormwater management facilities and Low Impact Development measures; natural heritage feature or area restoration and enhancement works; channel relocation and lowering; wetland and/or woodland restoration and enhancement works; passive recreational facilities and uses such as trails, interpretative displays and signage; and site alteration to accommodate the above uses.

Discussion of the Policy-Implementation Gap:

Despite this policy, pipeline twinning, which removed 441 trees (0.69 hectares) from Park Woodland A, ended up being permitted in the NHS, as described in 5.5.3 above.

My field visits revealed that trails in the NHS, which although allow for great passive recreation and access to nature, also greatly fragment the NHS (Figures 75–77), for instance one trail cuts through and fragments the northernmost Mayfield Woodland (Figure 75). The trails also allow people to dump garbage into the NHS (Figure 78).

5.5.6 The Recreational Open Space System and the Natural Heritage System are given a high profile within the community as visible and accessible public amenities, and are inter-connected to the greatest extent practicable where it has been demonstrated not to adversely impact the functions of the Natural Heritage System

Discussion of the Policy-Implementation Gap:

The interconnection between the NHS and recreational open space system, specifically trails, allow for great passive recreation and access to nature, however, my field visits revealed that trails also greatly fragment the NHS (Figures 75–77), for instance one trail cuts through and fragments the northernmost Mayfield Woodland (Figure 75). The trails also allow people to dump garbage into the NHS (Figure 78). In this way, the NHS is adversely impacted.

5.5.7 Pedestrian and cyclist linkages between the Natural Heritage System, Recreational Open Space facilities and school sites shall be provided where practical and it has been demonstrated not to adversely impact the functions of the Natural Heritage System. Such linkages shall be identified during the Block Plan Process and further refined during the processing of Subdivision Plans.

Discussion of the Policy-Implementation Gap:

The pedestrian and cyclist trails between the NHS, recreational open space system, and schools allow for great passive recreation, active transportation, and access to nature. However, my field visits revealed that trails also greatly fragment the NHS (Figures 75–77), for instance one trail cuts through and fragments the northernmost Mayfield Woodland (Figure 75). The trails also allow people to dump garbage into the NHS (Figure 78). In this way, the NHS is adversely impacted.

5.5.9 Notwithstanding the provisions of Section 4.5.6 of the Official Plan, the restoration of natural heritage features and areas shall be determined in accordance with the recommendations of the Mount Pleasant Subwatershed Study and consistent with the principles outlined in Appendix F of this Chapter and attached schedules.

Discussion of the Policy-Implementation Gap:

During this planning process, wetland restoration of the "Tooth" area to compensate for removed wetland area was greatly emphasized as justification for removing many wetland areas and as a way of meeting wetland cover targets (Stonybrook, 2011a, p. 3-10, 5-17, 5-18, 5-19, 13-24; AMEC, 2010a, p. 396–397; AMEC, 2010b, p. 63). However, the Mount Pleasant Secondary Plan Appendix F: Implementation Principles for the Mount Pleasant Subwatershed Study states that "planting or restoration in this area will not be completed by the City or the MPLG, but may be made by others and/or allowed to occur naturally" (Brampton, 2009b). No party was confirmed to be responsible for undertaking this restoration effort, meanwhile the environmental studies all discuss how this restoration will be the solution to the lost wetland area (Stonybrook, 2011a, p. 3-10, 5-17, 5-18, 5-19, 13-2; AMEC, 2010a, p. 396–397; AMEC, 2010b, p. 63). Through my field visits, I discovered that this area remains as a Regenerating Meadow, not a wetland (Figures 79–85). The educational signage at the site even refers to the "tooth" as a wetland area (Figures 86–89), however, the "tooth" is clearly a Regenerating Meadow with just a ditch to the east of it between it and Park Woodland C. By not confirming the responsibility of the restoration to any party, the restoration never happened, despite

the fact that the "tooth" was added to the NHS and environmental studies provided guidance on restoration implementation.

6.0 TRANSPORTATION POLICIES

6.2 Roads

6.2.2 In order to continue to fulfill the requirements of the Environmental Assessment Act, all roads not considered "Local Roads" and that are Collector Road projects associated with residential development where the proponent is a private sector developer, as determined by the City of Brampton, shall require the completion of an Environmental Assessment or equivalent process as permitted in the Municipal Engineers Association guidelines document Municipal Class Environmental Assessment. The Environmental Assessment or equivalent process shall be completed prior to and/or in tandem with the approval of Block Plans for each Sub-Area to ensure that appropriate measures are included to address the impact of any proposed road works. Collector Roads shall be finalized at the Block Plan Stage.

Discussion of the Policy-Implementation Gap:

Decisions on Road Class Environmental Assessment (EA) issues were made prior to the completion of the Class EA, additionally, the results of the Class EA were completely ignored, which resulted in a road being aligned through a future Provincially Significant Wetland.

The decision to realign Sandalwood Parkway north into Wetland 9 (Stonybrook, 2011a, p. 3-10) (Map 3; Figures 66, 67), a PSW Candidate chosen to be protected (Stonybrook, 2011a, p. 2-72), occurred prior to the release of the Sandalwood Parkway Extension from Creditview Road to Mississauga Road Class Environmental Assessment. The realignment was chosen before the Class EA approved a different alignment generally south of the wetland, which would have mitigated encroachment into the wetland (Stonybrook, 2011a, p. 3-10, 10-5–10-6). Even after the EA was released on November 22, 2010, and the results of the EA were known, the EA approved road alignment generally south of the wetland to minimize encroachment, was disregarded (Stonybrook, 2011a, p. 3-10, 10-5-10-6).

Prior to the release of the EA, the proposed realignment of Sandalwood Parkway northerly to accommodate an existing lacrosse field (Map 3 (Retained Lacrosse Field); Figure 98) was mentioned during EIR Workshop #1 (Stonybrook, 2011b, p. 6). However, the fact that this realignment would encroach further into Wetland 9 was not mentioned. During EIR Workshop #4, it was noted that MNR may not be aware that Sandalwood Parkway is shown through a portion of Wetland 9 (Stonybrook, 2011b, p. 27). Subsequently, a request was made by MNR to the City to explain the intent of the realignment (Stonybrook, 2011b, p. 31–32). The intent (which was divulged on March 2011, after the EA was released on November 22, 2010) turned out to be to retain the existing lacrosse field, but also to

"balance property interests" (by ensuring the road straddle the property line of both owners to the north and south so that the owner to the south would not have the road completely on their property which would have decreased the landowner's developable area), and to also reduce road curves and create a "better intersection configuration" (Stonybrook, 2011b, p. 31–32; Stonybrook, 2011a, p. 10-5–10-6). Even during the EIR Agency Meeting on June 28, 2011 (after the release of the EA on November 22, 2010), "MNR noted that these types of issues [concerning the road realignment] should be dealt with the road EA document. NM (an EIR consultant) noted that the EA document identified worst case and need to minimize transition grading into Wetland 9. A separate package will be prepared and circulated for comment outlining options and addressing impacts to Wetland 9 and City concerns for maintenance/safety. It will not form part of the EA but will be addressed through detailed design of Sandalwood Parkway" (Stonybrook, 2011b, p. 45).

Despite the fact that this was an EA issue, "[an Urbantech EIR consultant] noted that the road alignment will not be altered. Frank (Mazzotta- City Development Engineer) was present on behalf of the City. He noted that while he does not have benefit of background/context, they will review options and provide their input. They recognize that minimizing grading into Wetland 9 is important but it is not likely that the City will support some of the options from safety and maintenance perspectives. He noted that the City will not support offsetting the boulevard" (Stonybrook, 2011b, p.44–45).

Thus, the decision to realign the road into Wetland 9 was made prior to the EA, and the results of the EA did not change this decision. Property interests were upheld even over the Class EA.

6.2.4 Arterial, Collector and Local Roads will be located to avoid and/or minimize encroachments into the Natural Heritage System and will be designed to eliminate, minimize and/or mitigate impacts to the environmental hazards and ecological sensitivities of natural features and areas, as appropriate.

Discussion of the Policy-Implementation Gap:

As described in the analysis in 6.2.3, Sandalwood Parkway was not located to avoid or minimize encroachments into the NHS or natural features, instead, it was purposefully realigned into a future Provincially Significant Wetland to uphold property interests (Stonybrook, 2011a, p. 10-4 – 10-9; Stonybrook, 2011b, p. 31– 32).

6.2.7 The road network for the Mount Pleasant Secondary Plan shall be developed in the general location indicated on Schedule SP51 (a) and Schedule "D" and Schedule "E" of this Chapter, and in accordance with the applicable polices of this Chapter and other relevant policies of the Official Plan. Provided that the general intent of this Chapter is not compromised, adjustments may be made to the location, alignment and right-of-way widths of the road network including the provision of additional road crossings of the Natural Heritage System as may be appropriate and supportable through the Block Planning and Subdivision Approval processes. Potential Collector Road crossings between Sandalwood Parkway and Wanless Drive are shown as "Potential Connection" on Schedule SP 51(a) and are conceptual road crossings subject to further analysis at the Block Planning Stages in the context of the Mount Pleasant Secondary Plan Landscape Scale Analysis and Subwatershed Study. The "Collector Road" and "Transit Spine Collector Road" on Schedule SP 51(a) may have right-of-way widths ranging from 21.5 metres to 26 metres with the final right-of-way widths to be determined through the Block Planning and Subdivision Approval processes.

Discussion of the Policy-Implementation Gap:

This policy gives the impression that road alignments may be adjusted given that the general intent of this Chapter is not compromised, I would assume that the intent of this Chapter is not to align roads through future Provincially Significant Wetlands, but as described in the analysis in 6.2.3 and 6.2.4, Sandalwood Parkway was not located to avoid or minimize encroachments into the NHS or natural features, instead, it was purposefully realigned into a future Provincially Significant Wetland to uphold property interests (Stonybrook, 2011a, p. 10-4 – 10-9; Stonybrook, 2011b, p. 31– 32).

10.0 COMMUNITY BLOCK PLAN

10.1.4 As part of the Block Plan process, an Environmental Implementation Report shall be prepared to demonstrate that issues of stormwater management and infiltration, and confirmation of the limits of the Natural Heritage System, including the constraints of watercourse corridors, woodlands, wetlands, hedgerows and field swales are addressed. Detail studies will be addressed in accordance with the recommendations of the approved North West Brampton Landscape Scale Analysis and Subwatershed Study. The EIR shall consist of three parts: Existing Conditions and Constraint Mapping, Detailed Studies, and Stormwater Management.

Discussion of the Policy-Implementation Gap:

This policy gives the impression that the EIR will identify the impacts of the development and provide opportunities for mitigation of these impacts. As the analysis in 4.5.2 describes, this was not done.

In this chapter, I unpacked the policy framework from the Brampton Official Plan and the Mount Pleasant Secondary Plan. In doing so, I demonstrated the policy-implementation gap that I found as a result of my research. In the next chapter, I have organized my critique of the planning and development approvals process into 11 recommendations to make ecological conservation more successful.

Chapter 5: Discussions & Recommendations

Based on my research, and to overcome the issues that I have identified in the previous chapter, I offer several recommendations to make ecological conservation more successful.

These are:

1. Follow a Logical, Step-By-Step Decision-Making Process
2. Eliminate Competing Land Use Plans
3. Conduct One Comprehensive, Foundational & Integrated Environmental Study
4. Make Ecological Tradeoffs and Existing Tensions Transparent
5. Make Habitat Fragmentation Mitigation a Starting Point for Decision-Making
6. Make Chosen Habitat Fragmentation Mitigation Designs & Alternatives Transparent
7. Include Impact Assessment Targets in Secondary Plan Policy
8. Confirm Parties Responsible for Environmental Restoration & Management
9. Development Must Conform to the PPS and Class EAs
10. Planning Documents Must Be Easily Accessible Online
11. Recommended Environmental Planning Process

1. Follow a Logical, Step-By-Step Decision-Making Process

The overarching and biggest issue that I found during my research was that decisions were made in the wrong order, which ultimately led to ecological tradeoffs. There was no expectation for the planning process to unfold logically, to make decisions in the right order. For instance, looking at the Timeline for Environmental and Planning Studies for North West Brampton in the 2006 Brampton Official Plan (Brampton, 2006, p. 4.14-7), the City of Brampton Environmental Planning Process shown in the Subwatershed Study Phase 3 (AMEC, 2010b, p. 85), and the Mount Pleasant Secondary Plan Appendix F Schedule C Workplan and Schedule (Brampton, 2009b), it can be clearly seen that environmental studies, impact assessments, class environmental assessments, the secondary planning process, and the block planning process all overlap. There is no real step-by-step, logical decision-making process. Processes being done and decisions being made in the wrong order, led to ecological tradeoffs:

1.1 The collection of detailed information about existing natural features near the end of the planning process meant that this information was not available to make informed decisions about their conservation at the beginning of the planning process, when these features still could have been chosen to be saved. Environmental studies were conducted throughout the planning process in no real logical order (some were conducted prior to the preliminary land use plans, some during the secondary planning phase, some after the secondary plan approval, some during the block planning/EIR phase, some after the block plan approval, etc.). Detailed information about the natural features was found in later environmental studies, such as the EIR, which could have been used to make more informed decisions earlier in the planning process.

Therefore, I recommend that detailed information about existing natural features, sufficient enough to make informed decisions about their conservation, must be collected during one environmental study at the beginning of the planning process (as shown in my recommended planning process in recommendation 11).

1.2 The approval of plans prior to the completion of their corresponding environmental studies meant that there were many outstanding natural heritage issues when these plans were approved. For instance, irrespective of OP policy 4.5.1.3, the approval of the Secondary Plan OPA occurred prior to the completion of the subwatershed study. Similarly, irrespective of OP policy 4.5.2.1, the community block plan was approved prior to the completion of the EIR. These plans were approved despite the outstanding natural heritage issues.

Therefore, I recommend that one environmental study be done at the beginning of the planning process, and one series of impact assessments resolving all outstanding natural heritage issues be done prior to the approval of the Secondary Plan and Block Plan (as shown in my recommended planning process in recommendation 11).

1.3 Designating which natural heritage features to protect after the finalization of the Natural Heritage System meant that the existing natural landscape was not the starting point for decision-making, instead, any natural features outside of the NHS would not be protected despite their ecological value. For instance, the designation of PSWs was done after the NHS was already finalized. In this way, significant wetlands were not chosen to be conserved and then the NHS built to accommodate them, but a NHS to maximize developable area was chosen first, and any wetlands outside of this NHS would be removed, regardless of their ecological value. This similarly occurred with other natural features that were outside of the preferred NHS, in order to maximize the developable area.

I recommend that natural heritage features be designated for protection based on the results of the one environmental study (designations would occur after the environmental study is complete), prior to the creation of the preliminary land use plan (as shown in my recommended planning process in recommendation 11).

1.3.1 As discussed above, designating which natural heritage features to protect after the finalization of the Natural Heritage System meant that any natural features outside of the NHS would not be protected despite their ecological value. A big issue I found during this study was that the Provincially Significant Wetlands were determined by MNR after the NHS was already finalized. In fact, it was understood that the PSWs would be chosen "after the completion of the planning process; with the size and configuration of PSW units matching those conserved within the final NHS" (Stonybrook, 2011a, p. 2-72) and this was agreed upon and written into the Secondary Plan as part of the "Implementation Principles for the Mount Pleasant Subwatershed Study" (Brampton, 2009b). In this way, significant wetlands were not chosen first to be conserved and then the NHS built to accommodate them, but a NHS to maximize developable area was chosen first, and any wetlands outside of this NHS would be removed (Stonybrook, 2011a, p. 2-72), regardless of their ecological value. This similarly occurred with other natural features that were outside of the preferred NHS, in order to maximize the developable area.

In order to ensure significant wetlands are conserved, regardless of whether they are in a "convenient" location or not, and ensure PSWs determine the NHS, rather than the NHS determining the PSWs, I recommend that PSWs be determined by MNR after the one environmental study is completed, but before the creation of a preliminary land use plan.

In order to protect all natural features in the same way as PSWs and allow the existing natural features to be protected and shape the NHS, rather than the NHS determining which natural features get protected, I recommend that MNR and all stakeholders decide the significant natural features (woodlands, forest, wetlands, watercourse reaches, meadows, grasslands, abandoned pasture, hayfields, thickets, and individual trees, etc.) to be conserved after the one environmental study is completed, but before the creation of a preliminary land use plan (as shown in my recommended planning process in recommendation 11).

1.4 Making pivotal decisions that would substantially impact natural features at the end of the planning process meant that the features were not protected from the outset and would be prone to encroachment by development. For example, the decision to realign Sandalwood Parkway north into

Wetland 9, a PSW Candidate chosen to be protected (Stonybrook, 2011a, p. 2-72), occurred late in the planning process, during the block planning/EIR phase.

I recommend that all pivotal decisions concerning the natural features be negotiated and resolved early in the planning process during the designation of protected natural features (based on the one environmental study), Class EAs, and during the impact assessment (as shown in my recommended planning process in recommendation 11).

1.5 Making decisions concerning Class EA issues, such as major road alignments, before the Class EA is completed, means that the recommended alternative to mitigate ecological impacts provided by the Class EA, is completely ignored. For example, the decision to realign Sandalwood Parkway north into Wetland 9, a PSW Candidate chosen to be protected (Stonybrook, 2011a, p. 2-72), occurred prior to the release of the Sandalwood Parkway Extension from Creditview Road to Mississauga Road Class Environmental Assessment. The realignment was chosen before the Class EA approved a different alignment generally south of the wetland, which would have mitigated encroachment into the wetland. I recommend that decisions concerning Class EA issues must be made after the Class EA is complete

2. Eliminate Competing Land Use Plans

Another prominent issue I found during this study was that when it comes to making decisions about the landscape, having competing land use plans creates competition between actors which is counterproductive, makes the planning process even longer, and leads to decisions that result in ecological tradeoffs for the landscape. For example, when planning Mount Pleasant, there were three preliminary plans: the Landowners Plan, MNR/CVC Plan, and the City's Point of Departure Plan (Malone, 2011, p. 121–124, 133–134, 138–139). Each of these land use plans had different competing agendas (Malone, 2011, p. 121–124, 133–134, 138–139). The MNR/CVC plan was based on maintaining many natural features in their current state with no or minimal adjustments to the watercourse alignment and having a large NHS (30% of the total land area) (Malone, 2011, p. 121–124, 133–134, 138–139). The Landowners Plan was based on maximizing developable area to allocate the most net land area to residential use (mainly single-detached residential units) to maximize profits, with a NHS of only 13% of the total land area (Malone, 2011, p. 121–124, 133–134, 138–139). The City's POD plan was heavily based on the Landowners Plan both infrastructurally and economically, the lower density housing generates significantly more tax revenue to support City services per capita, while having less NHS area (16% of the total land area) means less maintenance costs for the City (Malone, 2011, p. 121–124, 133–134, 138–139). These plans were judged in terms of their required infrastructure and servicing and

fiscal and economic impact. Moving forward with the City's POD plan which mimicked the Landowners Plan, and not incorporating more of the existing natural features as the MNR/CVC plan did, meant a smaller NHS and the resulting ecological tradeoffs, as well as more tensions and competition between actors regarding planning the NHS later on, since the values of MNR and CVC were not reflected in the land use plan from the get-go.

I recommend not having this judicial process or competing land use plans, which all have very different agendas depending on the party that created them, instead, one plan should be created and agreed upon by all stakeholders and this plan should move forward in the secondary planning process (as shown in my recommended planning process in recommendation 11).

3. Conduct One Comprehensive, Foundational, and Integrated Environmental Study

I found many issues with the way environmental studies were conducted during this planning process. First, there were numerous separate environmental studies conducted which made it very difficult to piece together the information of each to even determine what natural features existed and the ecological functions and habitat they provide. Second, as discussed earlier, these different environmental studies were conducted throughout the different stages of the planning process (some prior to the preliminary land use plans, some during the secondary planning phase, some after the secondary plan approval, some during the block planning/EIR phase, some after the block plan approval), some of the information in the later environmental studies could have been useful for decision-making in terms of the protection of natural features earlier in the planning process, when these features still had a chance to be saved. Third, many of these environmental studies were commissioned by the Landowners group and were biased in terms of providing information to support their preferred land use plan (AMEC, 2010a, p. 129, 131, 135, 136, 165, 166, 309–310). Fourth, the early environmental studies such as the Subwatershed Characterization and Integration Report did not give a level of detail about many existing natural features, such as listing out and describing each wetland and woodland (as they had done with the creek reaches), that would have been sufficient to make informed decisions. This level of detail about the natural features was not given until the EIR, for instance, basic details about each wetland such as wetland type, water level fluctuations, and wildlife functions were only added to the EIR due to a recommendation given during EIR Workshop #3 (Stonybrook, 2011b, p. 19).

In order to document the existing natural features (the natural features at stake of being removed or altered by the new development) upfront and conduct an unbiased, "one-window" study of

these features, I suggest one environmental study of the secondary planning area be conducted by one consulting firm agreed upon by all parties (the City, Landowners, CVC, MNR) prior to the creation of any land use plans (as shown in my recommended planning process in recommendation 11). This environmental study would contain an inventory and map of all natural features (woodlands, forest, wetlands, watercourses including all of their reaches, meadows, grasslands, abandoned pasture, hayfields, thickets, and individual trees, etc.) in the secondary planning area. This environmental study would contain a level of detail about each natural feature to be sufficient to make decisions. This means that each existing natural feature and the ecological functions and habitat they provide would be obvious.

4. Make Ecological Tradeoffs and Existing Tensions Transparent

4.1 A big issue that I found during this study was a lack of transparency about the existing natural features and the ecological functions and habitat they provide at the very beginning of the planning process.

In order to be transparent about the ecological tradeoffs and explicitly show the existing natural features and their ecological functions that are at stake of being removed or altered by the new development, I suggest the one environmental study, including all of its maps, and appendices, all be easily assessible on the municipal website for the public and stakeholders to review prior to the release of any land use plans. All of the existing natural features should also be shown on one easily accessible map.

4.2 Resulting from the fact that one sufficiently detailed impact assessment was not done at the beginning of the planning process, the ecological impacts of the development were not transparent from the beginning of the planning process. During the initial Subwatershed Study Impact Assessment, the impacts of the proposed land use plans on the existing terrestrial and aquatic ecology were not explicitly stated and were only predicted qualitatively and conceptually "based on the Landscape Scale Analysis, other subwatershed disciplines (i.e. hydrogeology, hydrology hydraulics and water quality models) and experience elsewhere and knowledge of habitat/biota interactions" (AMEC, 2010a, p. 1, 377). In this way, the actual impacts to the existing natural features on the ground were not discussed. The impact assessment in terms of terrestrial and aquatic ecology became more of a "desktop study" or hypothetical impacts based on other developments "within similar physiographic settings" (AMEC, 2010a, p. 1, 377). The actual impacts on the ground that would result from the development, the ecological tradeoffs, were not transparent. For instance, the fact that 5 wetlands would be removed

(Stonybrook, 2011a, p. 2-72) was not explicitly stated, which creek reaches would be removed/altered/left as unprotected open channels was unclear (AMEC, 2010b, p. 68), the removal of the CNR Woodland, Hawthorn thicket, and hundreds of trees outside of the NHS was not mentioned (Stonybrook, 2011a, p. 7-1, 7-2; Kuntz, 2011, p. 8), the removal of a portion of the Regenerating Meadow was not mentioned (Stonybrook, 2011a, p. 7-1,7-2; Kuntz, 2011, p. 8), and the removal of the Bobolink meadow habitat was also not mentioned (Stonybrook, 2011a, p. 2-75, 13-25). This level of detail was not given until the EIR impact assessments, after the secondary plan was already approved, when these natural features could no longer be saved.

I recommend that one series of land use impact assessments (of the one agreed upon land use plan) be conducted prior to the Secondary Plan approval by one consulting firm agreed upon by all parties (the City, Landowners, CVC, MNR) (as shown in my recommended planning process in recommendation 11). This impact assessment must be transparent about the impacts and explicitly state which existing natural features will be altered, removed, or impacted in any way as a result of the development. This should consist of a quantitative analysis of all terrestrial and aquatic ecological impacts. For instance, the area of each natural feature that would be removed, how many trees outside of the NHS would be removed, the number and location of habitat fragmentations that will occur, the area of wetland catchment areas that would not be included in the NHS, etc. Therefore, the impacts that will occur will be explicitly stated and measured in a clear and transparent way.

4.3 In recommendation 1.4, I recommend that all pivotal decisions concerning the natural features be negotiated and resolved early in the planning process prior to the Secondary Plan approval (as shown in my recommended planning process in recommendation 11). By following my recommended planning process, the realignment of Sandalwood Parkway into Wetland 9 (Stonybrook, 2011a, p. 3-10), a PSW Candidate chosen to be protected (Stonybrook, 2011a, p 2-72), during the Block Planning/EIR process would not have occurred.

However, the realignment of Sandalwood Parkway also revealed the importance that stakeholders be transparent about their intentions during negotiations regarding natural features, no matter when these negotiations take place (such as during the designation of protected natural features (#3 of my recommended planning process in recommendation 11) or the negotiation and creation of the land use plan (#4 in my recommended planning process in recommendation 11).

For example, the proposed realignment of Sandalwood Parkway northerly to accommodate an existing lacrosse field was mentioned during EIR Workshop #1 (Stonybrook, 2011b, p. 6). However, the fact that this realignment would encroach further into Wetland 9 (Stonybrook, 2011a, p.3-10), a PSW

Candidate chosen to be protected (Stonybrook, 2011a, p. 2-72), was not mentioned. During EIR Workshop #4, it was noted that MNR may not be aware that Sandalwood Parkway is shown through a portion of Wetland 9 (Stonybrook, 2011b, p.27). Subsequently, a request was made by MNR to the City to explain the intent of the realignment (Stonybrook, 2011b, p. 31–32). The intent turned out to be to retain the existing lacrosse field , but also to "balance property interests" (by ensuring the road straddle the property line of both owners to the north and south so that the owner to the south would not have the road completely on their property which would have decreased the landowner's developable area), and to also reduce road curves and create a "better intersection configuration" (Stonybrook, 2011b, p. 31–32; Stonybrook, 2011a, p. 10-5–10-6). The intent behind the road alignment and the fact that it would encroach further into Wetland 9, was not transparent when the alteration was proposed, which created tension and competition between stakeholders, which is counterproductive.

I recommend that all parties be upfront and transparent about their intentions during all negotiations concerning natural features. Additionally, my new recommended planning process in recommendation 11 would ensure that these negotiations occur at the beginning of the planning process when natural features can still be saved. My new recommended planning process would also ensure that all stakeholders collaboratively determine and approve the natural features to be conserved, and collaboratively create and confirm the land use plan.

4.4 Another issue is transparency about the existing tensions between parties regarding planning the NHS. While not explicit, the EIR Meeting notes revealed that there were tensions between CVC/MNR and the City/Landowners regarding planning the NHS, especially concerning the removal of the racetrack pond (Wetland 12) (Stonybrook, 2011b, p. 6–7), the realignment of Sandalwood Parkway into Wetland 9, a PSW Candidate chosen to be protected (Stonybrook, 2011a, p. 2-72; Stonybrook, 2011b, p. 6, 27, 31–32, 44–45) and any proposed changes to the NHS boundaries (Stonybrook, 2011b, p. 6, 28). These tensions are important to know because they reveal the ecological tradeoffs of development and help the public and stakeholders to understand the decision-making process, and the "sides" the different parties took during difficult and contentious decisions regarding the NHS. Only the EIR meeting notes (Stonybrook, 2011b) at the end of the planning process were accessible on the municipal website and were incomplete and extremely difficult to find. I recommend that the existing tensions between parties regarding planning the NHS be transparent by making all meeting notes easily accessible on the municipal website.

5. Make Habitat Fragmentation Mitigation a Starting Point for Decision-Making

The fact that the design details regarding ecological connectivity such as road and rail culverts, were considered at the end of the planning process, during the EIR phase (Stonybrook, 2011a, p. 10-9–10-11, 10-13–10-14), proves that connectivity was not a starting point in the decision making. While there was an aspiration to have connectivity in the Mount Pleasant NHS (Stonybrook, 2011a, 2-36, 3-1, 3-2, 4-1, 5-4, 5-19; AMEC, 2010a, p. 260, 308, 377–381, 390), in a landscape fragmented and gridded by roads, this is next to impossible. The fact that known mitigation efforts were not assessed from the start, proves that the intent of connectivity could not have really been meant.

I recommend that known fragmentation mitigation efforts to aid in ecological connectivity such as road and rail culverts that support species movement be assessed from the start of the land use planning process.

6. Make Chosen Habitat Fragmentation Mitigation Designs & Alternatives Transparent

Another issue is transparency about the technical design details chosen regarding ecological connectivity such as road and rail culverts. For instance, the EIR did contain typical road culvert designs and CNR culvert designs with terrestrial benches for wildlife passage (Stonybrook, 2011a, p. 10-9– 10-11, 10-13– 10-14), as recommended in the Subwatershed Study Phase 3 (AMEC, 2010b, p. 61–62). However, these terrestrial benches were not implemented in the Sandalwood Parkway, Veterans Drive, or CNR culverts (Figures 72–74). There was no way to determine that these were not implemented besides actually visiting them in person or perhaps trying to contact someone involved in the planning or implementation process.

Additionally, the SWS recommended mitigating the existing impediment to upstream fish migration created by the existing CNR culvert (AMEC, 2010a, p. 387, Stonybrook, 2011a, p. 10-12–10-13). The EIR did contain two alternative culvert designs to mitigate this barrier (Stonybrook, 2011a, p. 10-13–10-14), however, neither of these designs were implemented. A design that improved connectivity compared to the existing culvert, but still created a greater barrier to fish movement in comparison to the EIR designs, was implemented (Figure 71). Given that the implemented design required less infrastructure, a reduced cost could be assumed. Again, the actual culvert implemented could not be known without visiting the actual culvert or perhaps by trying to contact someone involved in the planning or implementation process. Considering the roads and the CNR present the largest barriers to wildlife movement in the NHS and greatly fragment the NHS into smaller habitat patches, these ecological tradeoffs should be transparent.

I recommend being transparent about the technical design details chosen regarding ecological connectivity such as road and rail culverts. The designs and alternatives and the implemented design should be easily accessible on the municipal website.

7. Include Impact Assessment Targets in Secondary Plan Policy

Another issue is that not all of the targets of the Subwatershed Study were met during implementation. For instance, consensus was not achieved for forest and wetland cover targets and targets for contaminants of concern from stormwater runoff (AMEC, 2010b, p. 12, 13, 18, 19).

I recommend that the impact assessment targets (such as forest and wetland cover) be recognized through the Secondary Plan policy. Secondary Plan policy should state that the development is required to meet all impact assessment targets, and should have these precise targets stated and quantified, for instance, a policy could state the exact percentage of wetland cover that must be met in the development.

8. Confirm Parties Responsible for Environmental Restoration & Management

By not confirming the party responsible for environmental restoration and management early in the planning process, no party becomes responsible, and the environmental restoration and management is never done. For instance, during this planning process, wetland restoration of the "Tooth" area to compensate for removed wetland area was greatly emphasized as justification for removing many wetland areas and as a way of meeting wetland cover targets (Stonybrook, 2011a, p. 3-10, 5-17, 5-18, 5-19, 13-24, AMEC, 2010a, p. 396–397; AMEC, 2010b, p. 63). However, the Mount Pleasant Secondary Plan Appendix F: Implementation Principles for the Mount Pleasant Subwatershed Study states that "planting or restoration in this area will not be completed by the City or the MPLG, but may be made by others and/or allowed to occur naturally" (Brampton, 2009b). No party was confirmed to be responsible for undertaking this restoration effort, meanwhile the planning documents (such as the EIR) all discuss how this restoration will be the solution to the lost wetland area. Through my field visits, I discovered that this area remains as a Regenerating Meadow, not a wetland (Figures 79–85). The educational signage at the site even refers to the "tooth" as a wetland area (Figures 86–89), however, it is clearly a Regenerating Meadow with just a ditch to the east of it between it and the Park Woodland C. By not confirming the responsibility of the restoration to any party, the restoration never happened.

I recommend that restoration areas be agreed upon by all stakeholders and included in the land use plan, the party responsible for this restoration would be identified and agreed upon by all

stakeholders during the creation of the land use plan (as shown in my recommended planning process in recommendation 11).

9. Development must Conform to the PPS and Class EAs

A big issue found with this study was that the Sandalwood Parkway alignment into Wetland 9, a PSW Candidate chosen to be protected (Stonybrook, 2011a, p. 2-72), did not conform with the PPS which states that development and site alteration shall not be permitted within Provincially Significant Wetlands (PSWs) (irrespective of OP 4.5.9.1 and 4.5.9.2) , and at the same time, it disregarded the results of the Sandalwood Parkway Extension from Creditview Road to Mississauga Road Class Environmental Assessment, which approved the alignment of the road generally south of the wetland (Stonybrook, 2011a, p. 3-10, 10-5–10-6). However, this problem also arose because PSWs are not officially confirmed until after the NHS is finalized, as discussed in recommendation 1.3 and 1.3.1. This should not have to be a recommendation, the PPS and the Class EAs must be conformed to.

10. Planning Documents Must Be Easily Accessible Online

Another issue I found during this study was not being able to access or easily access all of the planning documents including land use plans, conceptual land use vignettes, block plans, and meeting notes. Not having easy access to these planning documents makes it seem as though the planning process and decision-making is occurring "behind closed doors" where the public cannot review or critique it. I recommend these documents be transparent and easily accessible on the City website for the public and all stakeholders to access.

11. Recommended Environmental Planning Process

Overall, in order to make ecological conservation more successful, I recommend the following logical, step-by-step environmental planning process:

1. One environmental study of the secondary planning area conducted by one consulting firm agreed upon by all parties.
2. PSWs determined by MNR for conservation based on the results of the one environmental study
3. Other environmentally significant natural features to be conserved (woodlands, forest, wetlands, watercourse reaches, meadows, grasslands, abandoned pasture, hayfields, thickets, and individual trees, etc.) are determined and approved by all parties based on the results of the one environmental study

4. One land use plan created containing all of the approved significant natural features confirmed by all parties collaboratively. This land use plan would also include the natural features to be created or restored (including fragmentation mitigation strategies such as aquatic culverts and terrestrial benches), agreed upon by all stakeholders, and the party responsible for this restoration would be identified and agreed upon by all stakeholders.
5. Any necessary Class EAs (for this development, only transportation/road Class EAs were necessary)
6. Review and impact assessment of the proposed development plan with clear (quantitative) ecological trade-offs identified and ecological targets for implementation set. This impact assessment must be conducted by one consulting firm agreed upon by all parties. If there are outstanding natural heritage issues, these must be resolved in the subsequent 2G land use plan and 2G impact assessment, and so on. All outstanding natural heritage issues must be resolved, and the resolutions must be agreed upon by all parties, before the impact assessment phase is completed. The ecological targets for implementation will be agreed upon by all parties and these targets must be met during implementation. Ecological targets include forest cover minimums, wetland cover minimums, stormwater runoff contaminant thresholds, erosion thresholds, etc.
7. Draft Land Use Plan and Draft Official Plan bylaw Amendment
8. Statutory Public Meeting to present and consider Draft Official Plan bylaw Amendment
9. Advisory Committee proposes plan to Council
10. Council debates plan bylaw
11. Submission of Plan bylaw to Province
12. Decision on plan bylaw by Province
13. Municipal Plan in Effect

All of my recommendations fit within this logical environmental planning process.

Overall, my recommendations and recommended environmental planning process address the issues that I identified in my policy analysis that led to a policy-implementation gap for natural heritage system policies, resulting in ecological tradeoffs. My recommendations offer solutions towards closing this gap and improving the outcomes for the ecosystems resulting from the environmental planning process.

Chapter 6: Conclusions & Future Research

Conclusions

As discussed by Hudson et al. (2019) in their study on policy failure and the policy-implementation gap, "there is an increasing awareness that policies do not succeed or fail on their own merits; rather their progress is dependent upon the process of implementation" (Hudson et al., 2019, p.1). This study reflects that tenet, in which natural heritage policies rooted in scholarship (landscape ecology, ecodesign, green infrastructure and the ecosystem approach) that set out a clear approach to doing environmental planning, failed to be implemented on the ground. This review of the environmental planning process shows how implementing these environmental planning approaches in practice is difficult due to the reality of economic, social, and political factors.

Despite natural heritage policies and their intent to guide environmentally sound and sustainable development, ecological tradeoffs occurred in favour of economic benefit for both the Landowners and the City for numerous planning decisions. Decisions about what the future engineered NHS would look like and the existing natural features to be removed to achieve this preconceived configuration were made from the get-go, prior to the completion of environmental studies or impact assessments (Malone, 2011, p. 121–124, 133–134, 138–139). The economic benefit resulting from a minimized NHS and maximized developable area for single-detached housing, drove the planning process from the start (Malone, 2011, p. 121–124, 133–134, 138–139). The existing natural heritage features did not shape the NHS, but the preconceived NHS determined which natural features would be destroyed or conserved.

While the environmental approaches were, in many ways, simply not followed, their theories were also skewed from their original intent in order to uphold the preferred, preconceived NHS that would maximize developable area. For instance, Forman would be disappointed to know that landscape ecology ideas of connectivity are being used as justification to destroy existing habitat patches and corridors. Realigning Huttonville Creek and engineering a new NHS along the creek were justified by the idea that the new NHS would connect the fragmented habitat patches of the Mount Pleasant area and restore ecological connectivity. However, the channel realignment and creation of the new NHS resulted in the destruction of existing watercourse corridors and habitat patches that fell outside this pre-conceived NHS alignment. Barnett, Beasley, and McHarg would not be impressed that the main tenet of ecodesign, inventorying natural features in order to protect them, has been morphed into a justification that environmental inventories alone are enough. The claim that the Mount Pleasant NHS will be

determined “through a combined landscape-scale and feature-based analysis that addresses the diversity, connectivity, and ecological features and functions and associated linkages of terrestrial and water features” (Brampton, 2010b, p. 7), through the numerous environmental inventories and studies done such as the Landscape Scale Analysis and Subwatershed Study, creates a façade that because so many studies were done, the outcome for the NHS will be ecologically sound and the existing natural features will be protected. However, my research reveals that these inventories do not ensure that natural features will be protected, nor are the results of these inventories always even considered when deciding which features to preserve as part of the new NHS. McHarg would be disappointed to know that just the fact that a natural feature inventory was done, is being used to falsely “prove” that good environmental planning must have been done. Meanwhile, existing natural features are being destroyed despite the inventories. Olmsted would also be disappointed that the original intent of green infrastructure is not always being implemented on-the-ground. While the scholarship on green infrastructure demonstrates how ecological functions and services can be restored in highly-degraded landscapes through human engineered greenspace, my research shows how green infrastructure can be (mis)used to justify the destruction of existing natural features since they can be “replicated” elsewhere. Additionally, while the scholarship discusses how a green infrastructure approach can conserve ecosystem values, functions and services to support both humans and wildlife, my research demonstrates that this original intent has been skewed in favour of anthropogenic ecosystem services, with ecological tradeoffs and shortcomings for wildlife.

Finally, while scholarship on the ecosystem approach recognizes the environment on the same level as social and economic concerns, and policies mimic this sentiment, this study demonstrates that decisions are still made to favour economic and social benefits that result in ecological tradeoffs. Additionally, similar to the ecodesign framework, the intent of the ecosystem approach is being skewed by the façade that because environmental studies were done, the ecosystem approach was followed. This study demonstrates that environmental studies do not ensure that environmental planning decisions would be made in accordance with an ecosystem approach—they do not even form the basis for development.

The underlying theme brought to light by this review of the Mount Pleasant environmental planning process is the “tabula rasae” or “blank slate” (Cronon, 2000, Mehan, 2017) planning of landscapes that have already been lived in and altered by human use. In Mount Pleasant, the natural environment produced through the planning process bears little resemblance to the previous landscape. The Mount Pleasant area was previously an agricultural land use area; thus, the Huttonville Creek

system was already altered for agricultural purposes and the existing aquatic and terrestrial habitat patches were highly fragmented. The fact that the land was already "disturbed" seems to have justified the alteration and destruction of the habitat remnants. The removal and alteration of the natural features outside of the preconceived, man-made channel and NHS were supposedly justified because the land was already altered by agricultural uses and the new NHS would provide a net gain in natural area and connect many previously fragmented natural features. In this way, the habitat remnants and the wildlife populations that they supported were not respected, instead, the landscape was treated as a "blank slate" on which a new, human-engineered NHS could be built and only the existing natural remnants that fit into this convenient, preconceived NHS would be spared. I had thought this view to be outdated: that only "pristine", "undisturbed" nature is worth preserving and existing habitat remnants can be destroyed since the landscape is already altered by humans. As Cronon describes, "What is true of natural systems is also true of human ones: much as we might like to turn back the clock and rearrange land use as if on a tabula rasa, there are complex historical reasons why people live and work in the places they do, and it is usually best to manage with those reasons in mind rather than wishing the world were otherwise. We can regret the fact that so many cities are built on floodplains or on prime agricultural land, but, given their histories, it would be astonishing if they were located anywhere else. Effective land management must be responsible not just to ecology, but to history as well" (Cronon, 2000, p. 675). In this way, the historical agricultural use of Mount Pleasant should not be seen as an excuse to treat the landscape as a blank slate, but the history and natural remnants should be respected and incorporated into the new community through environmental planning. As the ecodesign framework states, planners should work with natural systems and the existing natural features, not against them (Barnett & Beasley, 2015, p. 929). Ecodesign dismisses the "billiard table" (or blank-slate) method of planning which does not consider the existing natural ecology (Barnett & Beasley, 2015, p. 1893, 1901).

The engineered natural environment produced in Mount Pleasant through the planning process may have a "natural" aesthetic sufficient for social and recreational functions and provide post-development stormwater management functions. However, while providing these anthropocentric ecological services, the Mount Pleasant NHS lacks in providing ecological services to wildlife, particularly those of conservation importance or more sensitive species. Based on my field observations, I believe the Mount Pleasant NHS supports more generalist, urban-tolerant species, as well as a host of invasive species including Phragmites, Common Buckthorn, and Garlic Mustard. In this way, the ecosystem produced does not protect sensitive species or those of conservation importance or support a broader

range of biodiversity, but rather, it provides enough habitat for generalist species while maintaining anthropogenic ecosystem functions. Although the natural heritage policies reflected sound environmental planning principles (landscape ecology, ecodesign, green infrastructure and the ecosystem approach), these policies failed to be implemented on the ground as a result of the planning and implementation process and led to shortcomings in the ecosystem produced.

As Blais bluntly mentions in her book, *Perverse Cities* (2010): "The plans produced, ostensibly governing development patterns, seemed to say all the right things. We should create compact, liveable, mixed-use, vibrant, and less auto-dependent communities. And yet, when I looked around in the suburbs, things seemed little changed. The Toronto region, where I live, was (and is) growing by about 100,000 people every year…Yet, for the most part, these new suburbs seemed to be being built more or less as they always had been". This is the reality of Mount Pleasant.

The City of Brampton claims that Mount Pleasant is a "Smart Growth" community, with mixed-use, transit-oriented, "new urbanism" development that is based on the findings of environmental studies (Brampton, 2010b; Brampton, 2020a). Savanta Inc., who played a large role in NHS design, commissioned by the North West Brampton Landowners' Group, claims that "The Mount Pleasant development took on an innovative and ecologically-centered approach. This approach began with an inter-connected NHS of aquatic and terrestrial habitat design, followed by design of the urban fabric to ensure ecological and social resiliency" (Savanta Inc., 2020).

In reality, my research revealed that Mount Pleasant was planned very much like any traditional single-detached residential suburb. As discussed, land use planning and the identification of the NHS was not based on the results of environmental studies or the existing natural features. Instead, the land use plan and an engineered NHS based on a channel realignment to accommodate post-development storm water runoff, were preconceived based on the capitalist need to maximize profits through a maximized developable area to accommodate single-detached residential units (Malone, 2011, p. 121–124, 133–134, 138–139).

As Blais' (2010) book explains, subsidies, the tax system, and the profit-driven market, fuel continued sprawl. This economically fueled development pattern of single-detached residential sprawl is reflected in my research. Policies and that support more sustainable, ecologically responsible development patterns, including NHS policies that reflect sound environmental planning approaches (landscape ecology, ecodesign, green infrastructure, and the ecosystem approach), are up against a system that inherently works against them.

My research exposed the factors of the Mount Pleasant planning process that led to a policy-

implementation gap for natural heritage policies. I provided recommendations to eliminate these factors, including a new, logical planning process based on one comprehensive environmental study and without competing land-use plans. Overall, my research sheds light on how planners can work towards closing the policy-implementation gap for natural heritage policies to create better conservation outcomes.

Future Research

Heritage Heights

The “final frontier” for development in Brampton is the proposed “Heritage Heights” development adjacent westerly to Mount Pleasant (Marychuk, 2019; Brampton, 2020b). As one of the last undeveloped greenfields in Brampton, the Heritage Heights Secondary Plan “represents a great opportunity to do things differently” according to the City (Brampton, 2020b).

“The City has acquired the services of DIALOG Planning and Design, to launch a re-engagement strategy for the Secondary Plan process for Heritage Heights. The objective of the re-engagement strategy is to effectively and thoughtfully involve all landowners within the Secondary Plan area and the city at large in shaping the future of Heritage Heights. A design workshop was organized for November 26-29th [of 2019], to solicit the involvement of stakeholders, landowners, the Mayor and Council, and the public at large…” (Brampton, 2020b).

"The [Brampton] 2040 Vision aims to bring about real change in how we plan, including looking at all development as part of a whole. By working closely with stakeholders and residents from every experience and background, it is our goal to help 'complete' a Brampton that reflects the wants and needs of the people who live here," said Regional Councillor Martin Medeiros, Chair, Planning and Development Committee (Mazzucco, 2019).

Similarly, the City of Brampton Mayor, Patrick Brown, has stated: "The Heritage Heights visioning session provides an amazing opportunity for Bramptonians to get involved in shaping the last undeveloped area of our city into a Complete Community. I encourage all to attend and make their voices heard on what matters most to them, whether it's jobs, transit, healthcare or the environment. Together, we can create the foundation to build a Heritage Heights that is safe, sustainable and successful" (Mazzucco, 2019).

Despite these sentiments (stated in 2019) to plan differently, Heritage Heights seems like it is being planned in a virtually identical way to the Mount Pleasant planning process. The secondary planning process for the Heritage Heights Community actually began in December 2009, ten years

before these “visioning sessions” (Brampton, 2020b). The Subwatershed Study and LSA commenced in Fall 2011 with a preliminary concept plan (which includes a preconceived NHS) already released on November 20, 2012 and presented to Council in April 2013 (Brampton, 2012c; Brampton, 2013; Brampton, 2020b). By June 2014, an updated Land Use Plan was already approved in principle before Stage 2 of the Transportation Class EA was even completed in March 2015 (Brampton, 2020b). A Re-Engagement Strategy and approach for revisiting the Land Use Plan was launched which subsequently led to these visioning sessions in November 2019 (Brampton, 2020b).

It would be useful for future research to be done on the environmental planning process of Heritage Heights to determine how natural heritage system policies were implemented. Do the same policy-implementation gaps that were present in Mount Pleasant exist for Heritage Heights? Were there any improvements, or are the same factors that created the policy-implementation gap for Mount Pleasant present in Heritage Heights? Did the reengagement strategy alter the June 2014 Land Use Plan that was approved-in-principle? What were the outcomes for the NHS? What were the ecological tradeoffs?

Given that the natural heritage policies in the current September 2015 Office Consolidation of The City of Brampton 2006 Official Plan (Brampton, 2008), are practically identical to the original 2006 Official Plan that I analyzed in my research, it would be interesting to see if the intent of these policies (rooted in environmental planning approaches such as landscape ecology, ecodesign, green infrastructure, and the ecosystem approach) are upheld any better during implementation of the Heritage Heights NHS. Given that it has been almost a decade since the construction of Mount Pleasant began, and there are years to come before the planning of Heritage Heights is completed, researching Heritage Heights post-development would be an endeavor to see if environmental planning is being done in the same way that results in the same policy-implementation gap for Natural Heritage Systems.

Implementing Environmental Planning Approaches

My research uncovered how natural heritage policies rooted in scholarship (landscape ecology, ecodesign, green infrastructure and the ecosystem approach) that sets out a clear approach to doing environmental planning, failed to be implemented on the ground as a result of the planning and implementation process. My review of the environmental planning process shows how implementing these environmental planning approaches in practice is difficult due to the reality of economic, social, and political factors. For instance, Barnett, Beasley and McHarg, proponents of ecodesign, would be disappointed to know that environmental inventories are being done but the existing natural features

identified in those inventories are not being protected in the developed landscape. Additionally, Forman would disapprove of the way landscape ecology principles are not always being implemented on-the-ground and how landscape ecology principles of connectivity are being used as justification to alter or destroy existing natural features that are not part of the main connected system. Olmsted would be disappointed that green infrastructure is being used to justify the destruction of existing natural features since they can be "replicated" elsewhere. Proponents of the ecosystem approach would be disappointed that planning decisions are still made to favour economic and social benefits that result in severe ecological tradeoffs. Additionally, the intent of the ecosystem approach is being skewed by the façade that because environmental studies were done, environmental planning followed the ecosystem approach. This study demonstrates that environmental studies do not ensure that environmental planning decisions would be made in accordance with an ecosystem approach, and they do not even form the basis for development. Implementing any these environmental planning approaches in practice is difficult due to the reality that natural heritage systems are being built in convenient, preconceived ways that maximize developable area for economic gain. Future research should explore developments where the spirit of landscape ecology, ecodesign, green infrastructure, and the ecosystem approach are being followed and how lessons from these developments can be used to overcome economic, social, and political barriers that other places face when attempting to implement environmental planning approaches.

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Appendix 1: Planning Process Timeline

In order to unpack how the planning process unfolded and determine the decision points that led to the existing landscape, I had to determine the planning timeline for Mount Pleasant by acquiring and analyzing numerous municipal planning documents. Through the creation of this timeline, I was able to follow how the planning process unfolded from 2006 to 2013.

I acquired, researched, and analyzed numerous plans, environmental studies and development documents. Through this comprehensive analysis of the planning and development documents, I was able to compile a timeline of the Mount Pleasant NHS planning process. This timeline outlines the studies, meetings, preliminary plans, OPA submissions to the City, OPA Council approvals, OPA submissions to the Province, and OPA approvals by the Province that led to the creation of the existing Mount Pleasant NHS and landscape.

Date	Study	Meetings	Preliminary Plans & Submissions to the City	Planning Approvals	Provincial Submissions & Approvals
2006					
December 8					North West Urban Development Area (including Mount Pleasant Secondary Plan Area 51) was officially brought into Brampton's urban boundary through OMB approval of Regional and Municipal OPAs.
2007					
August	Draft North West Brampton Landscape Scale Analysis (LSA) in Support of the Mount Pleasant Secondary Plan Subwatershed Study by Dougan & Associates.				

Date	Study	Meetings	Preliminary Plans & Submissions to the City	Planning Approvals	Provincial Submissions & Approvals
November	Mount Pleasant and "Mount Pleasant Village" Natural Heritage and Drainage Investigations – Input to the Huttonville and Fletcher's Creek Subwatershed Study by Savanta Inc. and Urbantech on behalf of North West Brampton landowners.				
December	Draft Huttonville Creek and Area Wetlands Map and Background data summary of Candidate Provincially Significant Wetland (PSW) Units by MNR				
December	Phase 1 Subwatershed Characterization and Integration Report (Phase 1 SWS) by AMEC Philips Engineers, in association with Blackport and Associates, C. Portt and Associates, Dougan and Associates, and Parish Geomorphic retained by the City of Brampton, Credit Valley Conservation and the Region of Peel.				
"Late" 2007			"Landowners" Plan presented to the City.		
2008					
"Early" 2008			MNR/CVC Plan presented to the City.		
May	Infrastructure Servicing Study, Mount Pleasant Secondary Plan, Block 51 by R. J. Burnside and Associates Limited. (Final Study completed August 2009)				

Date	Study	Meetings	Preliminary Plans & Submissions to the City	Planning Approvals	Provincial Submissions & Approvals
2009					
January			Point of Departure (POD) Plan released by the City of Brampton		
January	City completed a structural review of the Natural Heritage System (NHS) depicted by the City of Brampton POD, the MNR/CVC and MPLG concept plans.				
January	Draft Savanta Inc. North West Brampton Wildlife Summary Report. Savanta Inc. retained by North West Brampton landowners (Final completed March 2009).				
March	Savanta Inc. North West Brampton Wildlife Summary Report. Savanta Inc. retained by North West Brampton landowners.				
March 4			Mount Pleasant Landowners Group (MPLG) presented Natural Heritage System (NHS) Preliminary Conceptual Plan Vignettes		
March 12	Fletcher's and Huttonville Creeks Subwatershed Study: Phase 1 Characterization and Integration Response Matrix with comments from City of Brampton, CVC, MNR, DFO and NWBLG.				

Date	Study	Meetings	Preliminary Plans & Submissions to the City	Planning Approvals	Provincial Submissions & Approvals
May	Phase 2: Subwatershed Impact Assessment Testing of the Point of Departure Plans presented and comments received from CVC, MNR, City, and Landowner Team.				
June	"Working Paper", Phase 2: Subwatershed Impact Assessment Testing of the Point of Departure Plans, North West Brampton, Mount Pleasant Community				
June			Draft Land Use Plan and Draft Official Plan Amendment (for the Mount Pleasant Secondary Plan) released		
June 15		Statutory Public Meeting to present and consider Draft Official Plan Amendment (for the Mount Pleasant Secondary Plan)			
July	PSW limit staking completed by the City, CVC, MNR and EIR consultants. Drawings prepared by Rady-Pentek Edwards Surveyors.				
August	Final Infrastructure and Servicing Study, Secondary Plan Area 51 (Mount Pleasant), City of Brampton by R. J. Burnside and Associates Limited				
August	Mount Pleasant Community Master Open Space Study prepared by STLA Design Strategies				

Date	Study	Meetings	Preliminary Plans & Submissions to the City	Planning Approvals	Provincial Submissions & Approvals
September	Mount Pleasant Secondary Plan Fiscal and Economic Impact Analysis by Hemson Consulting Ltd.				
September 15		City hosted a workshop with MNR, CVC, DFO and Landowners to discuss proposed land use change concerns, resolve POD Plan Natural Heritage System concerns, and review technical info for EIR & Block Plan.			
October 6-7		2-day workshop held for the City, MNR, CVC, DFO and Landowners to collaborate on outstanding issues of the subwatershed study, resolve POD Plan Natural Heritage System concerns, and review technical info for EIR & Block Plan.			
October 29		Meeting involving the City of Brampton, Credit Valley Conservation, Ministry of Natural Resources, and the Mount Pleasant Landowners' Group to develop a Secondary Plan Natural Heritage System and Implementation Principles for the Subwatershed Study as a requirement of the Mount Pleasant Community Secondary Plan Land Use Plan (2G) going forward to Council.			

Date	Study	Meetings	Preliminary Plans & Submissions to the City	Planning Approvals	Provincial Submissions & Approvals
November 10, 17, 24		Meeting involving the City of Brampton, Credit Valley Conservation, Ministry of Natural Resources, and the Mount Pleasant Landowners' Group to develop a Secondary Plan Natural Heritage System and Implementation Principles for the Subwatershed Study as a requirement of the Mount Pleasant Community Secondary Plan Land Use Plan (2G) going forward to Council.			
November 24			Mount Pleasant Secondary Plan Appendix F "Implementation Principles for the Mount Pleasant Subwatershed Study" and conceptual Secondary Plan Natural Heritage System agreed upon by the City of Brampton, Credit Valley Conservation, Ministry of Natural Resources, and the Mount Pleasant Landowners' Group as a requirement of the Mount Pleasant Community Secondary Plan Land Use Plan (2G) going forward to Council.		
December			Mount Pleasant Land Use Plan Proposal presented to the City's Planning and Development Committee.		
2010					

Date	Study	Meetings	Preliminary Plans & Submissions to the City	Planning Approvals	Provincial Submissions & Approvals
February 10				Mount Pleasant Secondary Plan OPA Approved.	
February 23					Mount Pleasant Secondary Plan OPA submitted to the Province.
February	Huttonville Creek Inter-catchment Diversion Assessment by the Subwatershed Study team approved by the North West Brampton Landowners Group (NWBLG), CVC and City of Brampton.				
March 16					Mount Pleasant Secondary Plan OPA approved by the Province. (The OPA was not appealed to the OMB)
March 25	Phase 2: Subwatershed Impact Assessment Testing of the Second Generation (2G) Land Use Plan results presented to the City, CVC, MNR and the landowners and their consultants.				
March	Submission of Environmental Implementation Report Terms of Reference				
March	Mount Pleasant Secondary Plan Compendium Analysis released				
April 13	Working Paper Phase 2: Subwatershed Impact Assessment Testing of the Second Generation (2G) Land Use Plan, dated March 2010, released for review and comment.				

Date	Study	Meetings	Preliminary Plans & Submissions to the City	Planning Approvals	Provincial Submissions & Approvals
May 3			Submission of the Block Plan OPA and associated Applications to Amend the Zoning By-law and Draft Plans of Subdivision to the City by Gagnon and Law Urban Planners, Ltd., KLM Planning Partners Inc., and MMM Group (various landowners).		
June 7		Statutory Public Meeting on Block Plan and Draft Plans			
June 9		EIR Workshop #1			
June 9	Submission of Staking of Environmental Features Limits (for EIR)				
June 10			Updated Block Plan: prepared by Gagnon + Law Urban Planners (formed the basis for the analyses presented in the Scoped EIR in August 2010)		
July 14		EIR Workshop #2			
July	Approval of EIR Terms of Reference				
August	Submission of Scoped EIR				

Date	Study	Meetings	Preliminary Plans & Submissions to the City	Planning Approvals	Provincial Submissions & Approvals
September 8		The results of the public meeting (June 7, 2010) contained in the Planning Report regarding the recommended approval of the Sub-Area 51-1 Block Plan was presented to the Planning, Design and Development Committee.			
September 15				Block Plan OPA approved in principle. Final block plan approval delegated to the Commissioner of Planning, Design and Development	
September	Vegetation Conservation Plan field assessments conducted by Kuntz Forestry Consulting Inc.				
October 13		EIR Workshop #3			
October	Completion of Vegetation Conservation Plan field assessments conducted by Kuntz Forestry Consulting Inc.				
November 10		EIR Workshop #4			
November 16		MNR submitted request to City to advise MNR of the City's intent regarding the realignment of Sandalwood Parkway.			

Date	Study	Meetings	Preliminary Plans & Submissions to the City	Planning Approvals	Provincial Submissions & Approvals
November 22	Sandalwood Parkway Extension from Creditview Road to Mississauga Road Class Environmental Assessment – Environmental Study Report (ESR) completed by ENTRA Consultants and Philips Engineering				
December 2		EIR Meeting: floodplain hydraulics and City Park alterations			
December 8		EIR Workshop #5			
2011					
January	Submission of Draft Full EIR including the draft Comprehensive Fisheries Compensation Plan (CFCP) by Savanta Inc. and the Vegetation Conservation Plan Block 51-1 Mount Pleasant Lands prepared by Kuntz Forestry Consulting Inc.				
February 9		EIR Workshop #6			
February 23				Block Plan OPA approved by Council	
March 4					Block Plan OPA submitted to the Province.
March 9		EIR Workshop #7			

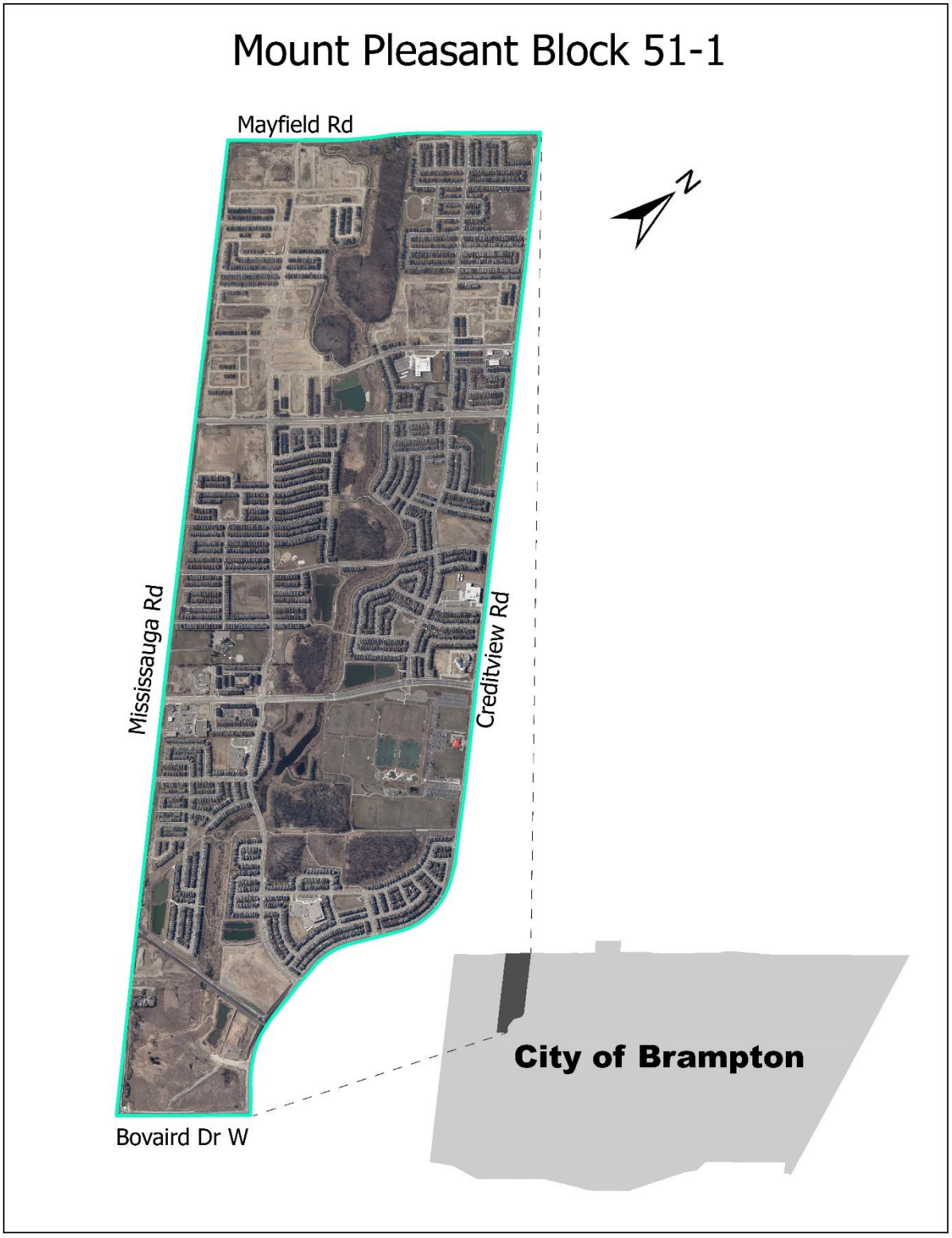
Date	Study	Meetings	Preliminary Plans & Submissions to the City	Planning Approvals	Provincial Submissions & Approvals
March 16		Meeting between T Farrell (MNR), M Jepp (from Paradise Homes Northwest Inc- Landowner), and N Mather (Stonybrook Consulting- EIR consultant) to explain the City's and Landowners' intent regarding the realignment of Sandalwood Parkway.			
March 25					Block Plan OPA approved by the Province. (The OPA was not appealed to the OMB)
April 13		EIR Workshop #8			
May 18		The City, CVC and MNR visit the "tooth" area to discuss restoration approaches.			
May 20				Block Plan OPA granted Stage 2 approval by the Commissioner of Planning, Design and Development.	
May	Mount Pleasant Block 51-1 Community Design Guidelines				
June	Phase 2 Subwatershed Study: Subwatershed Impact Assessment				
June	Phase 3 Subwatershed Study: Management Strategies and Implementation Plan				
June	Revised Comprehensive Fisheries Compensation Plan (CFCP)				

Date	Study	Meetings	Preliminary Plans & Submissions to the City	Planning Approvals	Provincial Submissions & Approvals
June 8		Agency Site Walk			
June 15		EIR Workshop #9			
June 28		Agency Meeting			
July 16		EIR workshop concerning wetland creation South of Sandalwood Parkway			
July 26		EIR Workshop #10			
August 16		Agency Meeting regarding natural channel design			
August	Sub- Area 51-1 Growth Management Staging and Sequencing Strategy Report by Gagnon + Law Urban Planners				
September	Final EIR Submission				
September	Final Comprehensive Fisheries Compensation Plan				
October 11				Plan of Subdivision Draft approved	
Fall 2011			Construction began in the first Stage 1A area		
2012/2013					
Late 2012 and Early 2013			Home closing dates began for the first Stage 1A area		

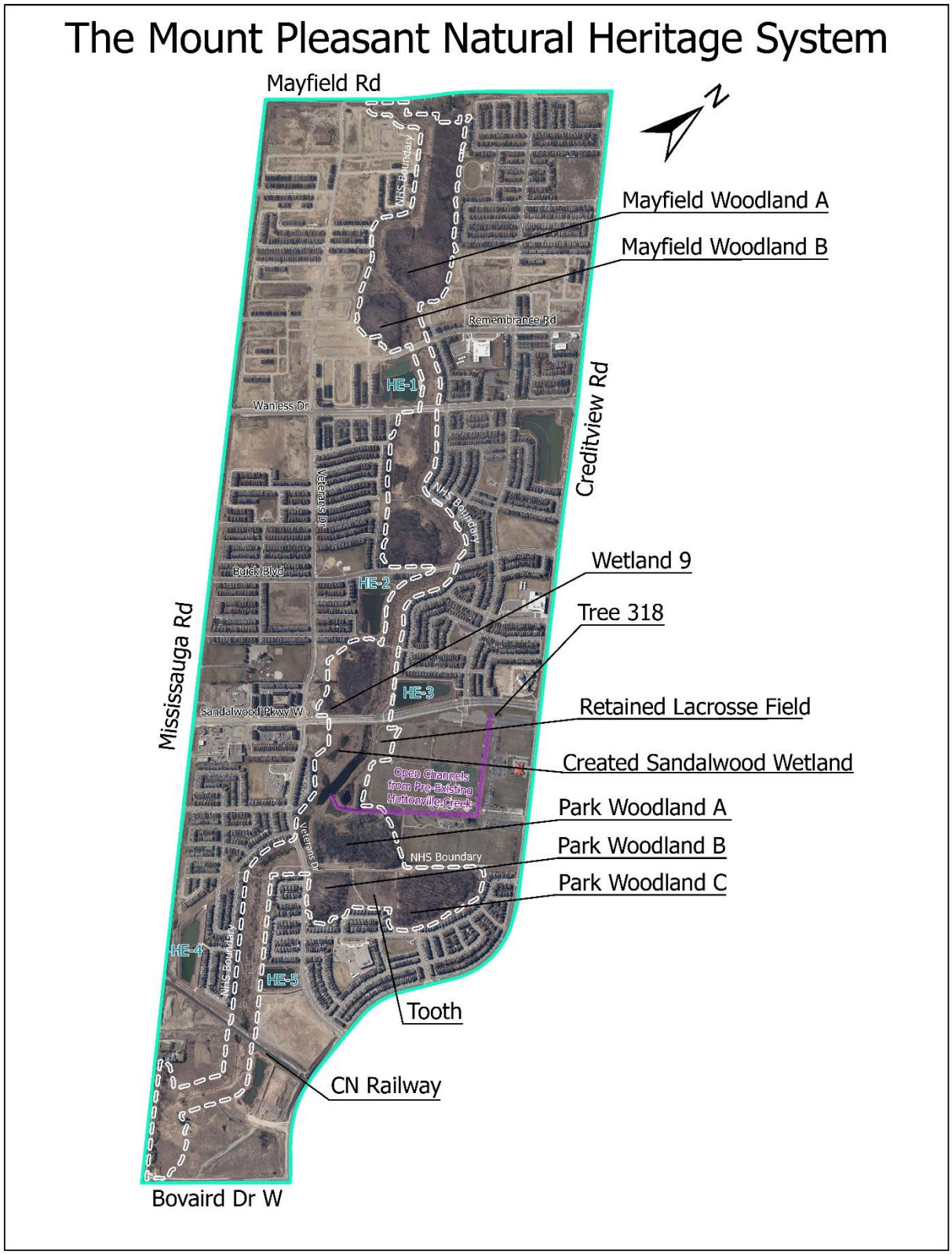
Appendix 2: Maps of Mount Pleasant, Brampton

To provide context for the Mount Pleasant (Block 51-1) case study area within the broader region, I created a map that demonstrates the location of Mount Pleasant within the Region of Peel and the wider landscape (Map 1) and within the City of Brampton (Map 2). To provide context for the Mount Pleasant Natural Heritage System and its locations and features discussed in my paper, I created a map that highlights the Mount Pleasant Natural Heritage System and its features (Map 3).

Map 1: Mount Pleasant (Block 51-1) Within the Region of Peel and the Wider Landscape. *This map provides context for the Mount Pleasant (Block 51-1) case study area within the Region of Peel and the wider landscape.*
Base Map Source: ESRI World Street Map (Night), updated July 22, 2020.
(https://www.arcgis.com/home/item.html?id=7e2b9be8a9c94e45b7f87857d8d168d6). Map Created using ArcGIS Pro.



Map 2: Mount Pleasant (Block 51-1) Within the City of Brampton. *This map provides context for the Mount Pleasant (Block 51-1) case study area within the broader region of the City of Brampton. Base Map Source: Region of Peel Spring 2019 Orthophoto. Map Created using ArcGIS Pro.*



Map 3: Mount Pleasant (Block 51-1) Natural Heritage System. *This map provides context for the Mount Pleasant (Block 51-1) Natural Heritage System and its locations and features discussed in my paper. Base Map Source: Region of Peel Spring 2019 Orthophoto. Map Created using ArcGIS Pro.*

Appendix 3: Site Photo-Documentation

To go about studying the existing landscape and be able to compare the outcomes of the planning process to natural heritage policies, I had to look at and assess the existing landscape through my own field observations and capture the site through photographs. Photo-documentation of the site is a way to record and visually demonstrate the existing landscape and natural features.

On April 6, May 6, and May 13, 2020, I conducted visual field assessments and photo-documented the Mount Pleasant NHS. Each visit consisted of a walk-through of the NHS where I assessed the implementation of the NHS policies, NHS plans, and SWS and EIR mitigation strategies.

***Figure 1: Mount Pleasant Natural Heritage System Trail**. The Mount Pleasant Natural Heritage System consists of a pedestrian trail which allows users to access nature within the City. Direction: Looking north. Location: Trail between Mayfield Rd. and Remembrance Rd. (West of Mayfield Woodland A). Coordinates: 43.696137, -79.85837*

***Figure 2: Mount Pleasant Natural Heritage System Trail**. Direction: Looking east. Location: Trail north of Park Woodland B. Coordinates: 43.67915, -79.835934*

Figure 3: Mount Pleasant Natural Heritage System and Huttonville Creek Aligned Between Residential Subdivisions. *Huttonville Creek was realigned to create a linear NHS that runs between the residential subdivisions on either side. The backyard fences provide an abrupt end to the NHS. Direction: Looking south. Location: Trail west of Veterans Dr. (north of CN Rail). Coordinates: 43.676976, -79.836658.*

Figure 4: Mount Pleasant Natural Heritage System and Huttonville Creek Aligned Between Residential Subdivisions. *Direction: Looking west. Location: Trail west of Veterans Dr. Coordinates: 43.67855, -79.837371*

Figure 5: Mount Pleasant Natural Heritage System and Huttonville Creek Aligned Between Residential Subdivisions*. Direction: Looking northwest. Location: West of Veterans Dr. (north of CN Rail). Coordinates: 43.673847, -79.832147*

Figure 6: Mount Pleasant Natural Heritage System and Huttonville Creek Aligned Between Residential Subdivisions. *Direction: Looking northwest. Location: West of Veterans Dr. Coordinates: 43.678685, -79.837448*

Figure 7: Mount Pleasant Natural Heritage System and Huttonville Creek Aligned Between Residential Subdivisions. *Direction: Looking west. Location: West of Veterans Dr. (north of CN Rail). Coordinates: 43.674762, -79.833682*

Figure 8: Mount Pleasant Natural Heritage System and Huttonville Creek Aligned Between Residential Subdivisions. *Direction: Looking west. Location: West of Veterans Dr. (north of CN Rail). Coordinates: 43.677264, -79.8375341*

Figure 9: Mount Pleasant Natural Heritage System and Huttonville Creek Aligned Between Residential Subdivisions. *Direction: Looking west. Location: Trail between Wanless Dr and Buick Blvd. Coordinates: 43.69041, -79.847594*

Figure 10: Mount Pleasant Natural Heritage System and Huttonville Creek Aligned Between Residential Subdivisions. *Direction: Looking southwest. Location: Trail south of Buick Blvd. Coordinates: 43.688758, -79.843244*

***Figure 11: Stormwater Management Pond North of Wanless Dr (HE-1)**. This stormwater management pond collects stormwater runoff from the surrounding residential subdivisions and releases it into Huttonville Creek. Direction: Looking west. Location: North of Wanless Dr. Coordinates: 43.692462, -79.851102*

***Figure 12: Stormwater Management Pond Outlet (HE-1)**. This drainage infrastructure for the stormwater management pond north of Wanless Dr directs water underneath the pedestrian trail and releases it into Huttonville Creek. Direction: Looking west. Location: North of Wanless Dr. Coordinates: 43.692462, -79.851102*

***Figure 13: Stormwater Management Pond Outlet (HE-1)**. Direction: Looking north. Location: North of Wanless Dr. Coordinates: 43.692382, -79.851012*

***Figure 14: Stormwater Management Pond Outlet (HE-1)**. Direction: Looking north. Location: North of Wanless Dr. Coordinates: 43.692382, -79.851012*

Figure 15: Stormwater Management Pond South of Buick Blvd (HE-2)*. Direction: Looking southwest. Location: South of Buick Blvd. Coordinates: 43.6872241, -79.8444855*

Figure 16: Stormwater Management Pond Outlet (HE-2). *Direction: Looking west. Location: South of Buick Blvd. Coordinates: 43.686636, -79.842733*

Figure 17: Stormwater Management Pond North of Sandalwood Pkwy (HE-3)*. Direction: Looking east. Location: North of Sandalwood Pkwy. Coordinates: 43.6844262, -79.8402734*

Figure 18: Stormwater Management Pond Outlet (HE-3). *Direction: Looking east. Location: North of Sandalwood Pkwy. Coordinates: 43.6847609, -79.8407172*

Figure 19: Stormwater Management Pond North of the CN Rail (HE-5). *Direction: Looking east. Location: North of CN Rail. Coordinates: 43.674762, -79.833682*

Figure 20: Aquatic Connectivity in Southern Portion of Huttonville Creek. *At the pedestrian bridge south of Buick Blvd, Huttonville Creek is highly connected with its high flows provided by the water input from stormwater management ponds. Invasive Phragmites can also be seen in this photo. Direction: Looking southeast. Location: South of Buick Blvd. Coordinates: 43.6860497, -79.8427*

Figure 21: Aquatic Connectivity in Southern Portion of Huttonville Creek. *North of Sandalwood Pkwy, Huttonville Creek is highly connected with its high flows provided by the water input from stormwater management ponds. Direction: Looking southwest. Location: North of Sandalwood Pkwy. Coordinates: 43.6847574, -79.8407009*

Figure 22: Aquatic Connectivity in Southern Portion of Huttonville Creek. *Direction: Looking northwest. Location: North of Sandalwood Pkwy. Coordinates: 43.685717, -79.841229*

Figure 23: Aquatic Connectivity in Southern Portion of Huttonville Creek. *Direction: Looking southwest. Location: North of Sandalwood Pkwy. Coordinates: 43.6847609, -79.8407172*

Figure 24: Water Pooling Behind Sandalwood Pkwy Culvert and No Terrestrial Bridges. *North of Sandalwood Pkwy, Huttonville Creek has a high volume of water provided by the water input from stormwater management ponds. The water pools behind the undersized culvert. No terrestrial benches are provided in this culvert for movement of terrestrial species. Direction: Looking southwest. Location: North side of Sandalwood Pkwy culvert. Coordinates: 43.6841436, -79.8404373*

Figure 25: Aquatic Connectivity in Southern Portion of Huttonville Creek. *South of Sandalwood Pkwy, Huttonville Creek is highly connected with its high volume of water provided by the water input from stormwater management ponds. The high volume of water spreads out in this portion of the creek after being funneled through the Sandalwood Pkwy culvert. Direction: Looking south. Location: South of Sandalwood Pkwy. Coordinates: 43.6835683, -79.8403001*

Figure 26: Aquatic Connectivity in Southern Portion of Huttonville Creek. *Direction: Looking southwest. Location: South of Sandalwood Pkwy. Coordinates: 43.6824073, -79.8388655*

Figure 27: Aquatic Connectivity in Southern Portion of Huttonville Creek. *East of Veterans Dr, Huttonville Creek is highly connected with its high volume of water provided by the water input from stormwater management ponds. The high volume of water pools behind the undersized Veterans Dr culvert. Direction: Looking north. Location: East of Veterans Dr. Coordinates: 43.6790017, -79.8371217*

Figure 28: Aquatic Connectivity in Southern Portion of Huttonville Creek. *Direction: Looking north. Location: East of Veterans Dr. Coordinates: 43.6790017, -79.8371217*

Figure 29: Water Pooling Behind Veterans Dr Culvert and No Terrestrial Bridges. *East of Veterans Dr, Huttonville Creek has a high volume of water provided by the water input from stormwater management ponds. The water pools behind the undersized culvert. No terrestrial benches are provided in this culvert for movement of terrestrial species. Direction: Looking north. Location: East of Veterans Dr. Coordinates: 43.6789871, -79.837457*

Figure 30: Aquatic Connectivity in Southern Portion of Huttonville Creek. *West of Veterans Dr, Huttonville Creek is highly connected with its high volume of water provided by the water input from stormwater management ponds. The high volume of water spreads out in this portion of the creek after being funneled through the Veterans Dr culvert. No terrestrial benches are provided in this culvert for movement of terrestrial species. Direction: Looking east. Location: West of Veterans Dr. Coordinates: 43.678685, -79.837448*

Figure 31: Aquatic Connectivity in Southern Portion of Huttonville Creek. *West of Veterans Dr, Huttonville Creek is highly connected with its high flows provided by the water input from stormwater management ponds. Direction: Looking northwest. Location: West of Veterans Dr. Coordinates: 43.678685, -79.837448*

Figure 32: Aquatic Connectivity in Southern Portion of Huttonville Creek. *Direction: Looking west. Location: West of Veterans Dr. (North of CN Rail). Coordinates: 43.673847, -79.832147*

Figure 33: Northernmost Point of Huttonville Creek. *Huttonville Creek begins at the northernmost point of the NHS just South of Mayfield Rd. The beginning of the creek is at a culvert that emerges from under Mayfield Rd, which collects runoff from the farmland north of Mayfield Rd. and from the ditches along Mayfield Rd. Without rainfall or snowmelt, this northernmost point of Huttonville Creek is practically dry, thus fragmenting the creek and the aquatic corridor. Direction: Looking northeast. Location: Immediately south of Mayfield Rd. Coordinates: 43.697508, -79.8637296*

Figure 34: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Without rainfall or snowmelt, this northern point of Huttonville Creek is practically dry, thus fragmenting the creek and the aquatic corridor. Silt fencing also drags through and fragments the creek at this point. Direction: Looking southeast. Location: Immediately south of Mayfield Rd. Coordinates: 43.69751, -79.863717.*

Figure 35: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Without rainfall or snowmelt, this northern area of Huttonville Creek is extremely shallow and practically dry. Riparian vegetation including Cattails and invasive Phragmites completely fill in the creek in some locations. Thus, the aquatic corridor is still fragmented in the northern portion of Huttonville Creek. Direction: Looking north. Location: South of Mayfield Rd. Coordinates: 43.697719, -79.862923*

Figure 36: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Direction: Looking north. Location: South of Mayfield Rd. (just north of the pedestrian bridge). Coordinates: 43.697919, -79.860374*

Figure 37: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Direction: Looking east. Location: South of Mayfield Rd. (just north of the pedestrian bridge). Coordinates: 43.697919, -79.860374*

Figure 38: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Direction: Looking south. Location: South of Mayfield Rd. (at the pedestrian bridge). Coordinates: 43.6979192, -79.8603742*

Figure 39: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Direction: Looking east. Location: South of Mayfield Rd. (at the pedestrian bridge). Coordinates: 43.6978305, -79.8602344*

Figure 40: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Direction: Looking north. Location: South of Mayfield Rd. (south of the pedestrian bridge). Coordinates: 43.697087, -79.859516*

Figure 41: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Direction: Looking southeast. Location: South of Mayfield Rd. (south of the pedestrian bridge). Coordinates: 43.6970869, -79.8595155*

Figure 42: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Direction: Looking southeast. Location: South of Mayfield Rd. (south of the pedestrian bridge). Coordinates: 43.696552, -79.858703*

Figure 43: Aquatic Fragmentation in Northern Portion of Huttonville Creek.
Direction: Looking south. Location: Between Mayfield Rd. and Remembrance Rd. Coordinates: 43.695878, -79.858606

Figure 44: Aquatic Fragmentation in Northern Portion of Huttonville Creek.
Direction: Looking east. Location: Between Mayfield Rd. and Remembrance Rd. Coordinates: 43.694583, -79.85854

Figure 45: Aquatic Fragmentation in Northern Portion of Huttonville Creek.
Direction: Looking northeast. Location: Between Mayfield Rd. and Remembrance Rd. Coordinates: 43.694269 ,-79.858018

Figure 46: Aquatic Fragmentation in Northern Portion of Huttonville Creek.
Direction: Looking northeast. Location: Between Mayfield Rd. and Remembrance Rd. Coordinates: 43.694141, -79.85779

Figure 47: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Direction: Looking east. Location: North of Remembrance Rd. Coordinates: 43.694141, -79.85779*

Figure 48: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Without rainfall or snowmelt, the creek is extremely shallow and fragmented in this location. Riparian vegetation including Cattails and invasive Phragmites completely fill in the creek. Thus, the aquatic corridor is still fragmented in the northern portion of Huttonville Creek. A large amount of Phragmites can be seen in this location. Direction: Looking southeast. Location: North of Remembrance Rd. Coordinates: 43.694141, -79.85779*

Figure 49: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Direction: Looking east. Location: North of Remembrance Rd. Coordinates: 43.694141, -79.85779*

Figure 50: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Direction: Looking southeast. Location: North of Remembrance Rd. Coordinates: 43.694141, -79.85779*

Figure 51: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Direction: Looking northeast. Location: Immediately north of Remembrance Rd. Coordinates: 43.69348, -79.853309*

Figure 52: Aquatic Fragmentation in Remembrance Rd Culvert. *Huttonville creek is extremely thin and shallow beneath the Remembrance Rd culvert. Without rainfall or snowmelt, this northern area of Huttonville Creek is extremely shallow. Thus, the aquatic corridor is still fragmented in the northern portion of Huttonville Creek. Direction: Looking north. Location: Southern side of Remembrance Rd. Coordinates: 43.693442, -79.852966*

Figure 53: Aquatic Fragmentation in Northern Portion of Huttonville Creek. *Direction: Looking southeast. Location: South of Remembrance Rd. Coordinates: 43.693435, -79.852817*

Figure 54: Aquatic Fragmentation in Northern Portion of Huttonville Creek & Erosion Control Grids. *Without rainfall or snowmelt, this northern area of Huttonville Creek is extremely shallow. Riparian vegetation including Cattails and invasive Phragmites completely fragment the creek. Thus, the aquatic corridor is still fragmented in the northern portion of Huttonville Creek. Erosion control grids are also used in this location to stabilize and control erosion and sedimentation of the realigned creek. Direction: Looking east. Location: South of Buick Blvd. Coordinates: 43.6868392, -79.8433107*

Figure 55: Aquatic Fragmentation in Northern Portion of Huttonville Creek & Erosion Control Grids. *Direction: Looking east. Location: South of Buick Blvd. Coordinates: 43.6868392, -79.8433107*

Figure 56: Tree #318, the Only Tree Out of 491 Individual Trees Outside of the NHS Conserved. *This Bur Oak tree is #318 out of 491 trees that existed outside of the preconceived NHS. This tree is the only tree outside of the NHS that was chosen to be conserved in the Vegetation Conservation Plan component of the EIR. No protective fencing was implemented around this tree, as the Vegetation Conservation Plan stated was to be implemented as a protective mitigation strategy. Direction: Looking east. Location: South of Sandalwood Pkwy in Creditview Sandalwood Park. Coordinates: 43.687097, -79.836952*

Figure 57: Tree #318, the Only Tree Out of 491 Individual Trees Outside of the NHS Conserved. *Direction: Looking east. Location: South of Sandalwood Pkwy in Creditview Sandalwood Park. Coordinates: 43.687097, -79.836952*

Figure 58: Remembrance Rd Bisecting the NHS. *Remembrance Rd bisects the Mount Pleasant Natural Heritage System, creating a huge barrier to terrestrial species movement. Direction: Looking northeast. Location: Just south of Remembrance Rd. Coordinates: 43.693083, -79.853002*

Figure 59: Remembrance Rd Southern Bridge Wall Bisecting the NHS. *Direction: Looking northeast. Location: Just south of Remembrance Rd. Coordinates: 43.69315, -79.852725*

Figure 60: Remembrance Rd Northern Bridge Wall Bisecting the NHS. *Direction: Looking southeast. Location: Just north of Remembrance Rd. Coordinates: 43.693108, -79.853354*

Figure 61: Wanless Dr Bisecting the NHS. *Wanless Dr bisects the Mount Pleasant Natural Heritage System, creating a huge barrier to terrestrial species movement. Direction: Looking northwest. Location: Just south of Wanless Dr. Coordinates: 43.692421, -79.850038*

Figure 62: Wanless Dr Northern Bridge Wall Bisecting the NHS. *Direction: Looking southeast. Location: Just north of Wanless Dr. Coordinates: 43.692188, -79.85063*

Figure 63: Wanless Dr Southern Bridge Wall Bisecting the NHS. *Direction: Looking northwest. Location: Just south of Wanless Dr. Coordinates: 43.692286, -79.850187*

Figure 64: Buick Blvd Bisecting the NHS. *Buick Blvd bisects the Mount Pleasant Natural Heritage System, creating a huge barrier to terrestrial species movement. Direction: Looking east. Location: Just north of Buick Blvd. Coordinates: 43.688938, -79.844045*

Figure 65: Buick Blvd Southern Bridge Wall Bisecting the NHS. *Direction: Looking northwest. Location: Just south of Buick Blvd. Coordinates: 43.689087, -79.84364*

Figure 66: Sandalwood Pkwy Bisecting the NHS and Aligned On Top of Wetland 9. *Sandalwood Pkwy bisects the Mount Pleasant Natural Heritage System, creating a huge barrier to terrestrial species movement. Sandalwood Pkwy was also realigned on top of the southern portion of Wetland 9. Direction: Looking west. Location: Just north of Sandalwood Pkwy. Coordinates: 43.6841257, -79.8403298*

Figure 67: Sandalwood Pkwy Northern Bridge Wall Bisecting the NHS and Aligned On Top of Wetland 9. *Sandalwood Pkwy bisects the Mount Pleasant Natural Heritage System, creating a huge barrier to terrestrial species movement. Sandalwood Pkwy was also realigned on top of the southern portion of Wetland 9. Direction: Looking west. Location: Just north of Sandalwood Pkwy. Coordinates: 43.684144, -79.840437*

Figure 68: Sandalwood Pkwy Southern Bridge Wall Bisecting the NHS. *Direction: Looking northwest. Location: Just south of Sandalwood Pkwy. Coordinates: 43.683527, -79.839627*

Figure 69: Veterans Dr Eastern Bridge Wall Bisecting the NHS. *The Veterans Dr bridge bisects the Mount Pleasant Natural Heritage System, creating a huge barrier to terrestrial species movement. Direction: Looking north. Location: East of Veterans Dr. Coordinates: 43.6790017, -79.8371217*

Figure 70: Veterans Dr Western Bridge Wall Bisecting the NHS. *Direction: Looking north. Location: West of Veterans Dr. Coordinates: 43.67876, -79.837424*

Figure 71: CN Rail Culvert. *The CN Rail crossing is a huge barrier to terrestrial and aquatic species movement. While a design that improved aquatic connectivity compared to the existing culvert was implemented, neither of the EIR designs were implemented. The chosen culvert design creates a greater barrier to fish movement in comparison to the EIR designs, with only 4 small holes to facilitate water flow and (potential) fish migration. The EIR-recommended terrestrial benches to facilitate terrestrial species movement under the culvert were also not implemented. Direction: Looking south. Location: Just north of the CN Rail. Coordinates: 43.673847, -79.832147*

Figure 72: Remembrance Rd Culvert with Terrestrial Bridges. *The Remembrance Rd culvert does have terrestrial bridges present, however, the culvert is undersized in relation to the large bridge walls which still create a barrier to terrestrial species movement (Figures 59,60). Direction: Looking north. Location: Just south of Remembrance Rd. Coordinates: 43.6934417, -79.8529661*

Figure 73: Wanless Dr Culvert with Terrestrial Bridges. *The Wanless Dr culvert does have terrestrial bridges present, however, the culvert is undersized in relation to the large bridge walls which still create a barrier to terrestrial species movement (Figures 62,63). Direction: Looking south. Location: Just north of Wanless Dr. Coordinates: 43.6923651, -79.8507072*

Figure 74: Buick Blvd Culvert with Terrestrial Bridges. *The Buick Blvd culvert does have terrestrial bridges present, however, the culvert is undersized in relation to the large bridge walls which still create a barrier to terrestrial species movement (Figure 65). Direction: Looking south. Location: Just north of Buick Blvd. Coordinates: 43.6892121, -79.8441024*

Figure 75: Trail Fragments Mayfield Woodland A. *A pedestrian trail completely bisects Mayfield Woodland A. In this way, the forest habitat patch is fragmented into two smaller patches. Direction: Looking east. Location: South of Mayfield Rd, at the west end of the pedestrian bridge. Coordinates: 43.697831, -79.860234*

Figure 76: Trail Keeps Park Woodlands Disconnected. *Pedestrian trails prevent natural heritage features from ever connecting into larger habitat patches. For instance, the trails between the three Park Woodlands will keep them fragmented. This photo shows the trail that disconnects Park Woodland A (left) from Park Woodland C (right). Direction: Looking east. Location: Northwest corner of the "Tooth". Coordinates: 43.679679, -79.834835*

Figure 77: Trail Keeps Park Woodlands Disconnected. *Pedestrian trails prevent natural heritage features from ever connecting into larger habitat patches. For instance, the trails between the three Park Woodlands will keep them fragmented. This photo shows the trail that disconnects Park Woodland B (left) from Park Woodland A (right). Direction: Looking west. Location: Northeast corner of the "Tooth". Coordinates: 43.681156, -79.833675*

Figure 78: Trails Provide Opportunities to Dump Garbage into the NHS. *Pedestrian trails throughout the NHS provide opportunities for people to dump garbage into the NHS. Direction: Looking northeast. Location: Trail south of Mayfield Rd (just south of the pedestrian bridge). Coordinates: 43.697215, -79.85977*

Figure 79: The "Tooth" Regenerating Meadow Where Wetland Restoration Did Not Occur*. Wetland restoration of the "Tooth" area to compensate for removed wetland area was greatly emphasized as justification for removing many wetland areas and as a way of meeting wetland cover targets. The City and the Landowners Group were not responsible for this restoration and no party was confirmed to be responsible for undertaking this restoration effort. This area remains as a Regenerating Meadow, wetland restoration did not occur. Direction: Looking east. Location: Northwest corner of the "Tooth". Coordinates: 43.679679, -79.834835*

Figure 80: The "Tooth" Regenerating Meadow Where Wetland Restoration Did Not Occur*. Direction: Looking east. Location: Northwest corner of the "Tooth". Coordinates: 43.679679, -79.834835*

Figure 81: The "Tooth" Regenerating Meadow Where Wetland Restoration Did Not Occur*. Direction: Looking south. Location: Northwest corner of the "Tooth". Coordinates: 43.679679, -79.834835*

Figure 82: The "Tooth" Regenerating Meadow Where Wetland Restoration Did Not Occur*. Direction: Looking southwest. Location: Trail within the "Tooth". Coordinates: 43.679459, -79.83356*

***Figure 83: The "Tooth" Regenerating Meadow Where Wetland Restoration Did Not Occur**. Direction: Looking northeast. Location: Trail within the "Tooth". Coordinates: 43.679459, -79.83356*

***Figure 84: The "Tooth" Regenerating Meadow Where Wetland Restoration Did Not Occur**. Direction: Looking south. Location: Trail north of the "Tooth". Coordinates: 43.68027, -79.834692*

***Figure 85: The "Tooth" Regenerating Meadow Where Wetland Restoration Did Not Occur**. Direction: Looking east. Location: Trail within the "Tooth". Coordinates: 43.679452, -79.833603*

***Figure 86: Educational Signage Refers to the "Tooth" as a Restored Wetland.** The educational signage at the "Tooth" site refers to the "Tooth" as a wetland area, however, wetland restoration did not occur here, it remains a Regenerating Meadow. Location: Trail within the "Tooth". Coordinates: 43.6794592, -79.83356*

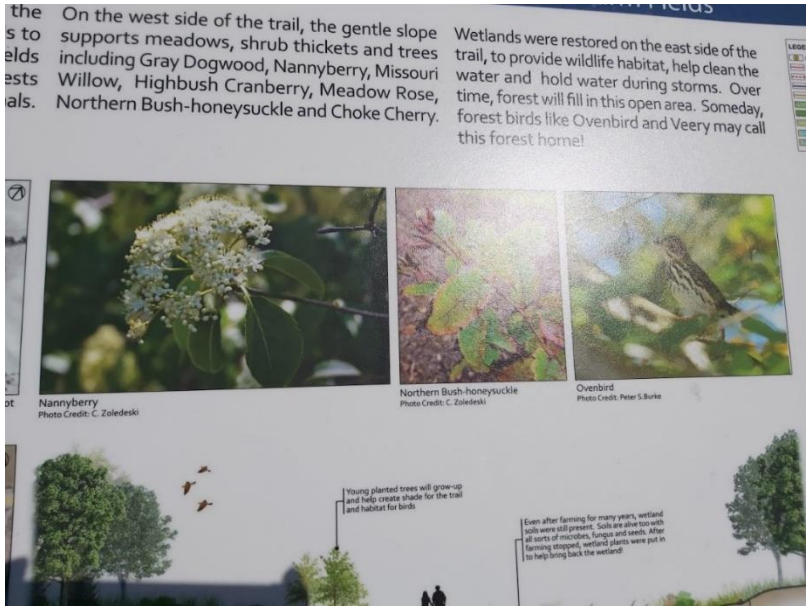


***Figure 87: Educational Signage Refers to the "Tooth" as a Restored Wetland**. Location: Trail within the "Tooth". Coordinates: 43.6794592, -79.83356*

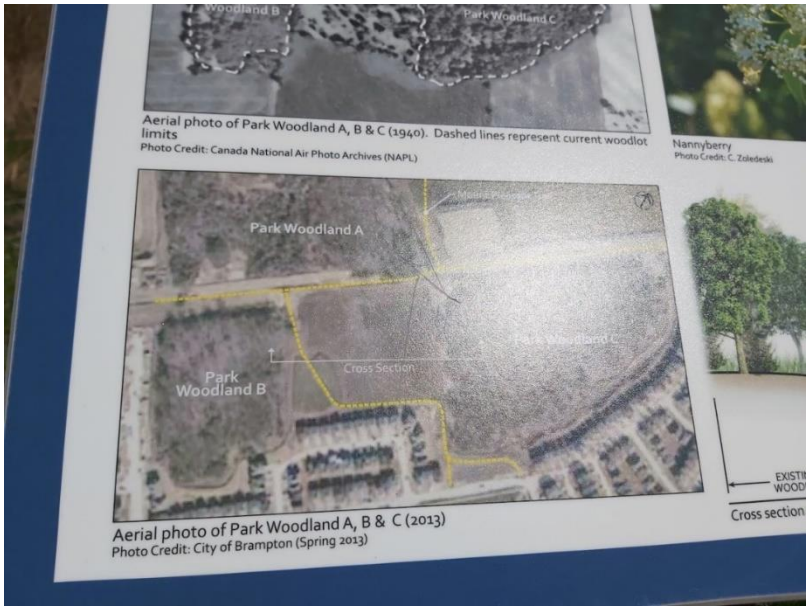


***Figure 88: Educational Signage Refers to the "Tooth" as a Restored Wetland.** The cross section shown refers to the "Tooth" as a wetland in Figure 89. Location: Trail within the "Tooth". Coordinates: 43.6794592, -79.83356*

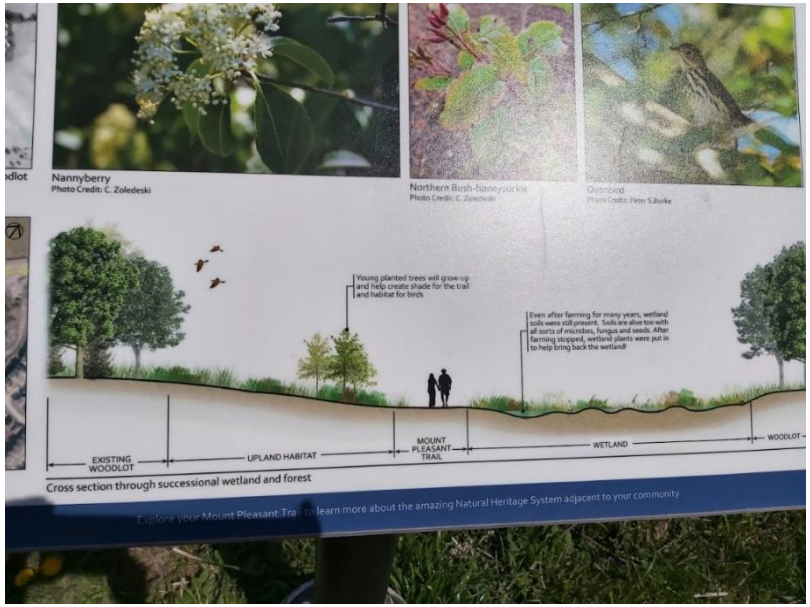


***Figure 89: Educational Signage Refers to the "Tooth" as a Restored Wetland.** The cross section shown refers to the "Tooth" as a wetland (See aerial cross section in Figure 88). Location: Trail within the "Tooth". Coordinates: 43.6794592, -79.83356*

***Figure 90: Educational Signage Refers to the "Tooth" as a Restored Wetland.** Location: Trail within the "Tooth". Coordinates: 43.6794592, -79.83356*

Figure 91: Educational Signage about Creek Realignment and the Creation of Sandalwood Wetland from Scratch. *This educational signage serves as a reminder that the NHS is engineered, with the realignment of Huttonville Creek and the creation of the Sandalwood Wetland south of Sandalwood Pkwy, which was created to "replace" the functions of wetlands removed during development. Location: South of Sandalwood Pkwy. Coordinates: 43.682952, -79.838715*

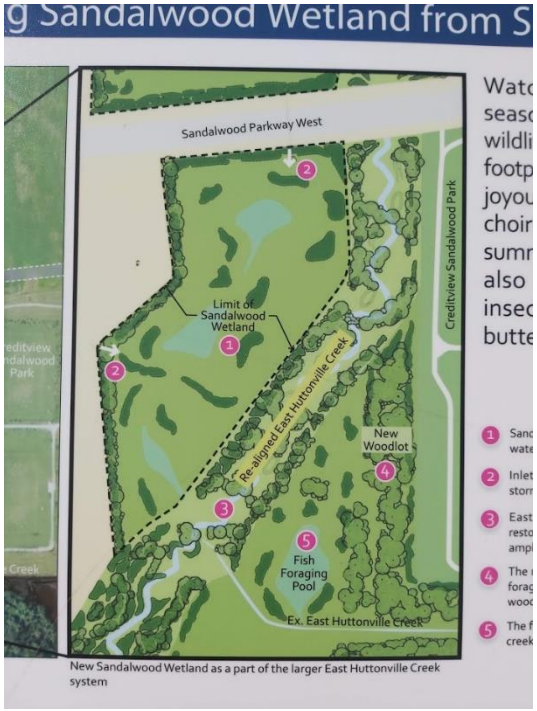


Figure 92: Educational Signage about Creek Realignment and the Creation of Sandalwood Wetland from Scratch. *Location: South of Sandalwood Pkwy. Coordinates: 43.682952, -79.838715*

Figure 93: Educational Signage about Creek Restoration on top of a Pipeline. *This educational signage serves as a reminder that the NHS is engineered. This sign explains the restoration of Huttonville Creek on top of three pipelines. Location: East of Veterans Dr. Coordinates: 43.677264, -79.8375341*

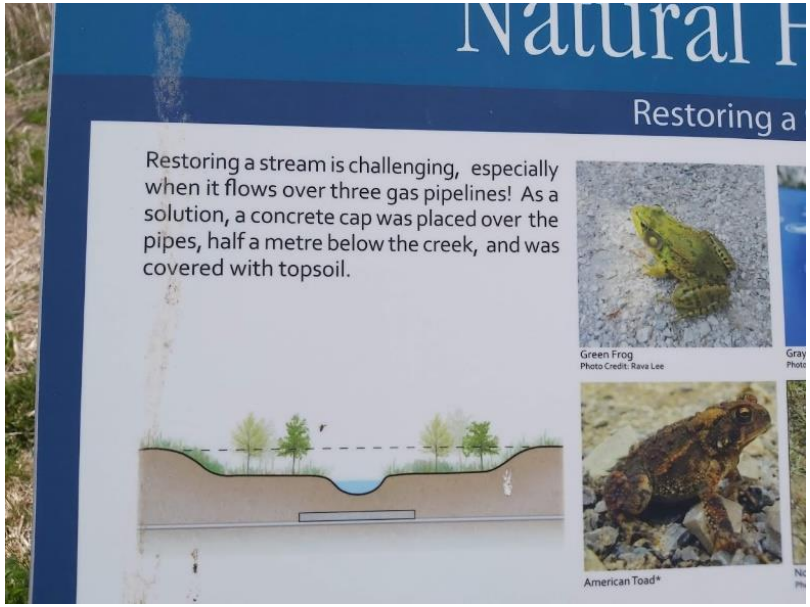


Figure 94: Educational Signage about Creek Restoration on top of a Pipeline. *Location: East of Veterans Dr. Coordinates: 43.677264, -79.8375341*

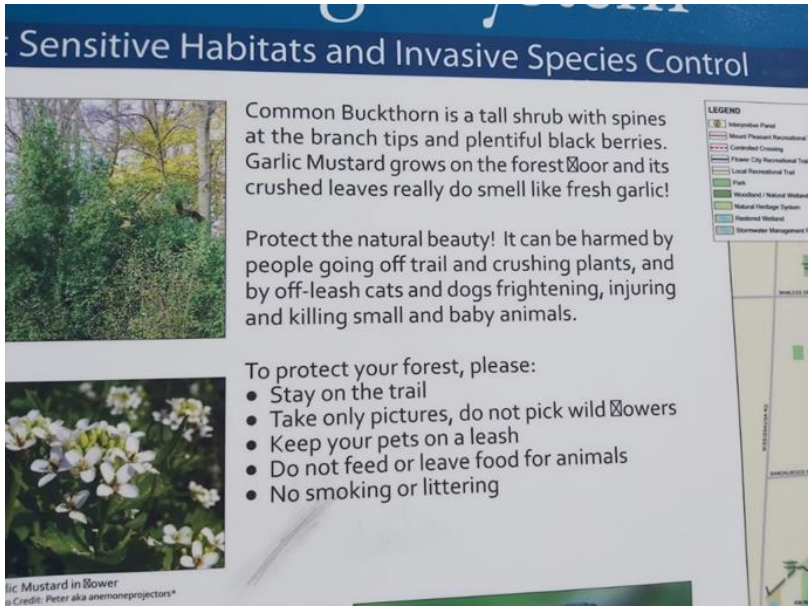


Figure 95: Educational Signage Referring to Invasive Species Within Woodlands. *This sign beside Mayfield Woodland A refers to invasive Common Buckthorn and Garlic Mustard found within the Mount Pleasant Natural Heritage System woodlands. Location: South of Mayfield Rd (at pedestrian bridge). Coordinates: 43.697831, -79.860234*

Figure 96: Mayfield Rd Creates Barrier to Connectivity North of the NHS. *Mayfield Rd creates a barrier for species movement north of the NHS. In this way, connectivity of the NHS with the broader region is reduced. Direction: Looking northeast. Location: Just south of Mayfield Rd. Coordinates: 43.69751, -79.863717*

Figure 97: Created Sandalwood Wetland to "Replace" Removed Wetlands*. The Sandalwood Wetland was created from scratch south of Sandalwood Pkwy in order to "replicate" the functions of removed wetlands. Direction: Looking south. Location: Just south of Sandalwood Pkwy. Coordinates: 43.6834213, -79.8404515*

Figure 98: Lacrosse Field Retained Which Resulted in Sandalwood Pkwy Alignment Over Wetland 9. *In order to retain this existing lacrosse field, Sandalwood Pkwy was realigned northerly into Wetland 9, a PSW Candidate chosen to be preserved. However, other factors played a role in the road realigned such as "balancing property interests" and a "better intersection configuration".*

Figure 99: Former Huttonville Creek Reach Left As An Unprotected Open Channel. *This open channel running through the Creditview Sandalwood Park is a remnant of the former Huttonville Creek alignment. This former creek reach is no longer connected to the realigned Huttonville creek and has been left unprotected outside of the NHS in Creditview Sandalwood Park. Direction: Looking southeast. Location: South of Sandalwood Pkwy in Creditview Sandalwood Park. Coordinates: 43.687097, -79.836952*

Figure 100: Former Huttonville Creek Reach Left As An Unprotected Open Channel. *Direction: Looking south. Location: South of Sandalwood Pkwy in Creditview Sandalwood Park. Coordinates: 43.687097, -79.836952*

Figure 101: Former Huttonville Creek Reach Left As An Unprotected Open Channel. *Direction: Looking east. Location: South of Sandalwood Pkwy in Creditview Sandalwood Park. Coordinates: 43.685332, -79.829645*

Figure 102: Former Huttonville Creek Reach Left As An Open Channel. *This open channel running south of Creditview Sandalwood Park is a remnant of the former Huttonville Creek alignment. This former creek reach is no longer part of the new Huttonville creek alignment, however it is still part of the NHS. Direction: Looking west. Location: South of Creditview Sandalwood Park. Coordinates: 43.682421, -79.835702*

Figure 103: Pipeline Runs Through the NHS, Pipeline Twinning Removed Portion of Park Woodland A*. Despite Park Woodland A being part of the protected NHS, pipeline twinning of the existing pipeline just south of the woodland ended up removing 441 trees (0.69 hectares) from Park Woodland A (Brampton, 2012b, p. 27, 73), although new trees were planted back in the temporary work easements Location: Trail south of Park Woodland A. Direction: Looking northwest. Coordinates: 43.6813649, -79.8335244*

Figure 104: Pipeline Runs Through the NHS, Pipeline Twinning Removed Portion of Park Woodland A*. Direction: Looking north. Location: Trail south of Park Woodland A. Coordinates: 43.680592, -79.834345*

Appendix 4: List of Acronyms

Acronym	Full Term
2G	Second Generation
City	City of Brampton
CNR	Canadian National Railway
CFCP	Comprehensive Fisheries Compensation Plan
CVC	Credit Valley Conservation
DFO	Department of Fisheries and Oceans
EA	Environmental Assessment
EIR	Environmental Implementation Report
ESA	Endangered Species Act
ESR	Environmental Study Report
FSRs	Functional Servicing Reports
GGH	Greater Golden Horseshoe
GIS	Geographic Information Systems
LSA	Landscape Scale Analysis
MESP	Master Environmental Servicing Plan
MNR	Ontario Ministry of Natural Resources
MOE	Ontario Ministry of the Environment
MPLG	Mount Pleasant Landowners Group
NEB	National Energy Board
NHS	Natural Heritage System
NWBLG	North West Brampton Landowners Group
OMB	Ontario Municipal Board
OP	Official Plan
OPA	Official Plan Amendment
POD	Point of Departure
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetland
SWM	Stormwater Management
SWS	Subwatershed Study
TCPL	Trans-Canada Pipeline Limited
TRCA	Toronto and Region Conservation Authority